

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 886. (No. 51, Vol. XVII.)

DECEMBER 17, 1925

Weekly, Price 6d.
Post free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2.
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

* Foreign subscriptions must be remitted in British currency.

CONTENTS

	PAGE
Editorial Comment	
All-Metal Aeroplanes	817
A New Westland Machine	819
Light Plane and Glider Notes	820
Light Plane Clubs Doings	821
All-Metal Flying-Boat Hulls	823
Personals	825
Air Surveying in Burma	826
The Rickenbacker Commercial Aero Engine	828
The Late E. T. Busk	829
In Parliament	830
Royal Air Force	831
R.A.F. Intelligence	831
Correspondence	832
Aero Golfing Society	832
Imports and Exports	832

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1926	
Jan. 12	Mr. C. Howarth. "Some Aspects of Full-Scale Experiments," before Inst.Ae.E.
Jan. 13	London Aeroplane Club Inaugural Dance, Suffolk Galleries, Suffolk St. W.1.
Jan. 26	Lieut. Olechnovitch. "The Care and Maintenance of Tools as an Important Factor in Workshop Routine," before Inst.Ae.E.
Feb. 9	Informal Meeting, Inst.Ae.E.
Feb. 25	Mr. A. J. Cobham. "Long-Distance Aeroplane Flights," before R.Ae.S.
Mar. 9	Mr. O. E. Simmonds, M.A., A.F.R.Ae.S., M.I.Ae.S. "The Development of Civil Marine Aircraft," before Inst.Ae.E.
April 13	Mr. S. H. Evans, B.Sc. "The Performance of Modern Aircraft—with special reference to the Variable Wing," before Inst.Ae.E.
April 21	Inst. Ae.E. visit to Messrs. D. Napier and Son, Acton.

EDITORIAL COMMENT.



THE subject of all-metal aeroplane construction is very much to the fore at the moment. A paper on this subject by M. E. Dewoitine, the famous French aeroplane designer, was read before the Institution of Aeronautical Engineers on Tuesday of this week, in which the author, who was, unfortunately detained in Italy on urgent business and was thus unable to read his paper in person—outlined the history of all-metal construction as it has developed in France during the last ten years or so. Space does not permit of publication of the paper this week, but we hope to give a fairly lengthy résumé of it in a subsequent issue of FLIGHT. In the meantime, it may be stated that one very strong reason for the pronounced preference which French aircraft designers show for Duralumin is due to the fundamental question of supplies. France has not the high-grade steels used in modern British all-metal aircraft, but the supply of aluminium and its alloys is plentiful in France, and it was therefore very natural that French designers should turn their attention to this material. In his paper M. Dewoitine did not, perhaps, stress this point, dealing rather with the choice of material from structural considerations. Thus, he mentioned that in a Nieuport machine exhibited at the last Paris Aero Show the spars were in the form of Duralumin beams, and he expressed the opinion that this choice, by a firm who have always been staunch supporters of wood construction, might be accounted for by the fact that, in the particular machine referred to, wood spars would not have provided the necessary strength.

In this country, on the other hand, Duralumin has been officially banned for use in highly stressed parts, and, as a result, British designers who were faced with the problem of developing all-metal construction, had of necessity to turn their attention to steel. While thus France has successfully developed Duralumin construction to a very considerable extent, Great Britain has concentrated on steel construction, and,

although as yet it is only a relatively small percentage of our constructors who have specialised on this form of construction, there is scarcely a British firm that has not experimented with metal construction in one form or another. We think it can justly be claimed that in the construction of aeroplanes in high-grade steels Great Britain has attained a pre-eminent position, and, as the Air Ministry has of late consented to relax somewhat the restrictions on the use of Duralumin, and several British constructors have produced machines mainly or even exclusively made of this material, it may be expected that in this branch also British designers will soon be able, if they do not already do so, to hold their own. For the Air Ministry concession in the matter of using Duralumin, the firm of Short Brothers can, perhaps, claim the bulk of the credit, Mr. Oswald Short having for many years been convinced of the merits of this material, and having demonstrated that he was right by building machines, aeroplanes as well as flying-boat hulls, in which this metal was used with great success.

This week the announcement is made that the Air Ministry has decided "in principle" to make the change to all-metal construction, and that after a period of approximately two years no new designs will be considered unless they incorporate all-metal construction. This does not, of course, mean that the sweeping change from composite construction to all-metal construction will be carried out in the twinkling of an eye, but that aircraft firms will, if they are to have any hopes of keeping going, during the next two years or so have to lay down plant for the production of metal machines and make the change-over gradually.

At first sight it might be thought that the proposed change would mean rather a revolution in the aircraft industry. Actually the change has been foreseen by practically all the existing firms, and, as we have already said, there are very few firms who have not done a certain amount of work on these lines. At the same time, it is not to be expected that the change will be made without certain losses. One cannot make omelettes without breaking eggs, and in the case of the majority of the aircraft firms it is to be feared that very considerable expenditure will have to be incurred in purchasing special tools, etc. We think that in view of the vital importance to this

country and to the Empire of being in a position, in case of war, to secure quantity production, the Air Ministry, or rather the Treasury, should undertake to bear a share of the burden which will thus be imposed on the aircraft industry, even if this take the form of a loan on reasonably favourable terms to firms for the purchase of new plant. In his paper M. Dewoitine stated the cost of special plant for the production of his Duralumin machines as 1½ million francs, and Mr. J. D. North, who has probably had more experience than any other British designer of all-metal aircraft, stated during the discussion following the reading of the paper that he did not consider this figure too high. It will thus be seen that the sums involved may be very considerable, and in the national interest it would seem only fair that constructors, who are, after all at finality, but the servants of the Empire, should be financially assisted by the state in a matter which so vitally affects the future of the Empire.

Concerning the ability of British constructors to make the change-over, and to produce all-metal machines second to none in the world, we have no fear. Many have already proved their ability, and the rest have only been prevented from doing so by the great cost involved, for which there was no justification so long as orders were not assured. A round of our aircraft factories reveals a great variety of forms of metal construction and, provided the Government is prepared to assist during the transition period, we are convinced that the next few years will see a number of different types produced, each with its own particular merits. That is all to the good, since it cannot be said that metal aircraft construction has yet reached other than an experimental stage, and that therefore standardisation at the present moment, or within the next few years, would be a mistaken policy. It can almost be said that every one of the twenty or so British aircraft firms has experimented with and developed to a more or less satisfactory stage, a special type of construction, and it is to be expected that, with the proposed change-over drawing near, progress during the next two years or so will be rapid. The firms who have specialised for several years past on all-metal construction will now, let us hope, reap the reward of their foresight. The others will very soon, we are sure, adapt themselves to the new conditions.



Marquis de Pinedo Visits London.

MARQUIS DE PINEDO, the Italian airman who recently accomplished a remarkable 34,000-mile flight from Rome to Australia and Japan and back in a Savoia S.16 ter flying boat (400 Lorraine-Dietrich), paid a visit to London on December 12. He was received at Victoria Station by the First Secretary of the Italian Embassy, representing the Ambassador, by Gen. Guidoni, the Italian Air Attaché, and by a representative of the Air Ministry. The Marquis expressed the opinion that there was a great future in the world of commerce for the seaplane, which he considered more suitable and more economical than the aeroplane for long distance flights. He further stated that it was probable that several commercial air lines will be inaugurated in the East by Italy.

A German Seaplane Competition

GERMANY is to have an important seaplane competition next year. It will be of a national character, the pilots, entrants and machines being German, but foreign motors will, it is stated, be permitted if application is made for such permission. The competition will have for its object the production of a seaworthy, efficient and reliable postal

machine, and as is usual with German competitions, complicated formulæ will be employed for judging the merits of the various competitors. The competition is timed to commence some time in July, and will be held at Warnemünde on the Baltic. Prizes to the total value of 250,000 mark (£12,500) are available, and the competition will be divided into three sections, flights along the coast to various towns: technical performance trials, and seaworthiness tests.

Paris-London Revised Fares

IMPERIAL AIRWAYS, LTD. inform us that, owing to the rapid depreciation of the French Franc, they are reluctantly compelled to increase the fares from Paris to London, as from December 1, to 600 frs. single and 1,100 frs. return.

A Channel Islands Air Service Again

THE Air Ministry has given sanction to a scheme submitted for an air service between London and the Channel Islands, to start next spring. Supermarine "Southampton-Napier" flying-boats will be employed on this new Channel service, which will be a daily one occupying two hours for the entire trip (with a stop at Southampton), as against about 10 hours taken by train and steamship.

A NEW WESTLAND MACHINE

The "Yeovil" Day-Bomber

THE Westland "Yeovil" Day-Bomber, designed and built by the Westland Aircraft Works (Branch of Petters, Ltd.), Yeovil, is claimed to be an advance on existing types of machines for this purpose. A machine for day bombing should possess certain characteristics which are not so much needed on machines required for other purposes. In particular, it is very essential that the observer should have a

of the pilot slopes down to the engine. This has the effect of very greatly improving the pilot's view forward.

The armament of the machine consists of a gun firing forward and two guns firing aft. The undercarriage has a wide track, and the shock is absorbed by means of oleo legs.

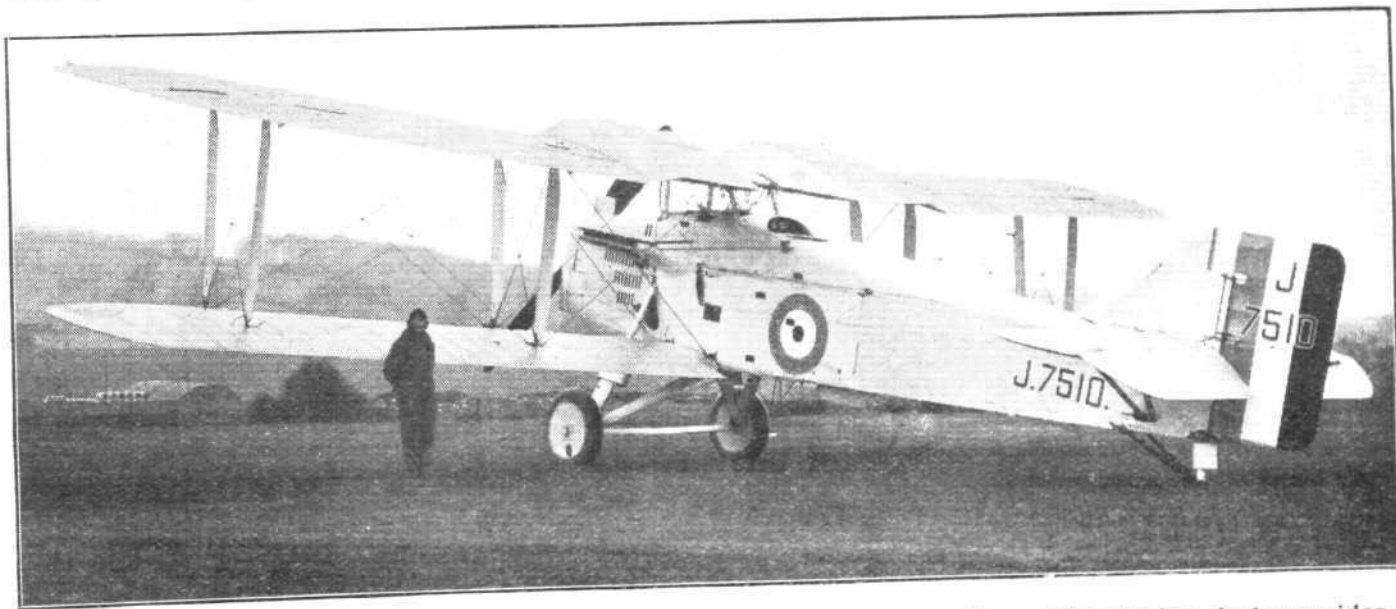
Ailerons are fitted to the top planes only, but are of large area, and give very effective and light control.



A NEW WESTLAND MACHINE: The "Yeovil" is a Day-Bomber fitted with Rolls-Royce "Condor" engine. In this front view the Leitner-Watts metal propeller is a notable feature, as are also the high-lift section gravity petrol tanks.

really good uninterrupted view downwards, to enable him effectively to use one or other of the accurate bomb sights which are now obtainable. In addition, a bombing machine should have a good degree of positive stability, and should fly very steadily. Otherwise it will be impossible to use the bomb sights effectively.

It will be noted that the wing section on each side of the centre section is different from the remainder of the wing. The petrol tanks are housed inside this thick section, which has high-lift characteristics. It will thus be seen that the petrol supply is entirely by gravity, which is a very desirable feature, particularly for a military machine.



THE WESTLAND "YEOVIL" DAY-BOMBER: Three-quarter rear view. The sloping deck provides a good view forward for the pilot, while the rear gunner, being clear of the wings, has a very free field of fire and a good view downwards for bomb sighting.

All these points have received special attention in the Westland "Yeovil" bomber. Both the pilot and observer have a very good view for their respective operations, the pilot being in front, and the gunner placed aft of the trailing edge of the wings.

As can be seen from the photographs, the decking in front

The engine is a 600 h.p. Rolls Royce "Condor," fitted with a metal propeller.

As the machine was built for the Air Ministry, we are not permitted to give any details of its actual performance, but we may say that this is considered highly satisfactory.

R.A.F. Cairo-Cape Flight

PREPARATIONS for the R.A.F. Flight (All-British) from Cairo to Cape Town and back have commenced. The five machines to be employed on this flight are now being prepared at the Fairey Aviation Co.'s works at Hayes. They will be Fairey IIIa biplanes (land-type), fitted with Napier

"Lions." Wing-Commander C. W. H. Pulford, O.B.E., A.F.C., will be the leader of the flight, and the four other members will be Flight-Lieuts. E. C. Emmett, M.C., D.F.C.; L. E. M. Gillman; E. J. L. Hope, A.F.C.; and P. H. Mackworth, D.F.C. A start will be made in March next, and they hope to be back in Cairo by June.

LIGHT 'PLANE AND GLIDER NOTES

THE preliminary announcement concerning the light 'plane competition to be held in August of next year was published some time ago, but owing to pressure on our columns it has not been possible to publish Light 'Plane and Glider Notes for some time, and consequently there has been no opportunity to comment upon the proposed regulations. To begin with, FLIGHT has repeatedly criticised the basis chosen, *i.e.*, a permissible engine weight of 170 lbs., on the score that it would tend not to reduce the power and cost of engines but to increase them. An engine weight of 170 lbs. is quite considerable, as will be realised when it is pointed out that the old Grahame-White "box kites" of the 1913-14 vintage, so familiar to the habitués of the Hendon aerodrome in the old days, would be admitted as light 'planes under the most recent official definition of the class, their 50 h.p. Gnome engines weighing rather less than the 170 lbs. now permitted. A photograph of one of these machines is published herewith.

IN the past our criticism of the engine weight basis has been mainly directed against a possible Air Ministry competition in 1926. Since, however, there does not appear to be any likelihood of such a competition being held, it will be necessary to examine how this basis will affect the 1926 *Daily Mail* competition. The preliminary announcement was published in FLIGHT of October 8, 1925, in which it was stated that an engine weight of 170 lbs. would be permitted, this figure including carburettor and induction system, complete ignition equipment, airscrew hub and fastenings, exhaust pipes (if any), and radiator, pipes and water (if any). Thus the engine weight basis still remains, but the rules for the *Daily Mail* Competition provide that first prize will go to the competitor whose machine carries the greatest useful load per unit of fuel consumed on the 2,000 miles' flight.

Thus the engine weight basis may not be quite so open to objection in this competition, since fuel economy is to play such a prominent part. It is stipulated that the competing machines must maintain an average speed of at least 50 m.p.h. around the 2,000 miles' course, but beyond this fact no special speed is stipulated, that is to say, provided competitors average 50 m.p.h. no extra marks are gained by covering the course at any greater speed. The probability, therefore, is that machines will be designed with a view to obtain just sufficient reserve to ensure getting round at just over this speed and no more, since fuel economy will be the aim, and this is more likely to be attained with a relatively slow machine.

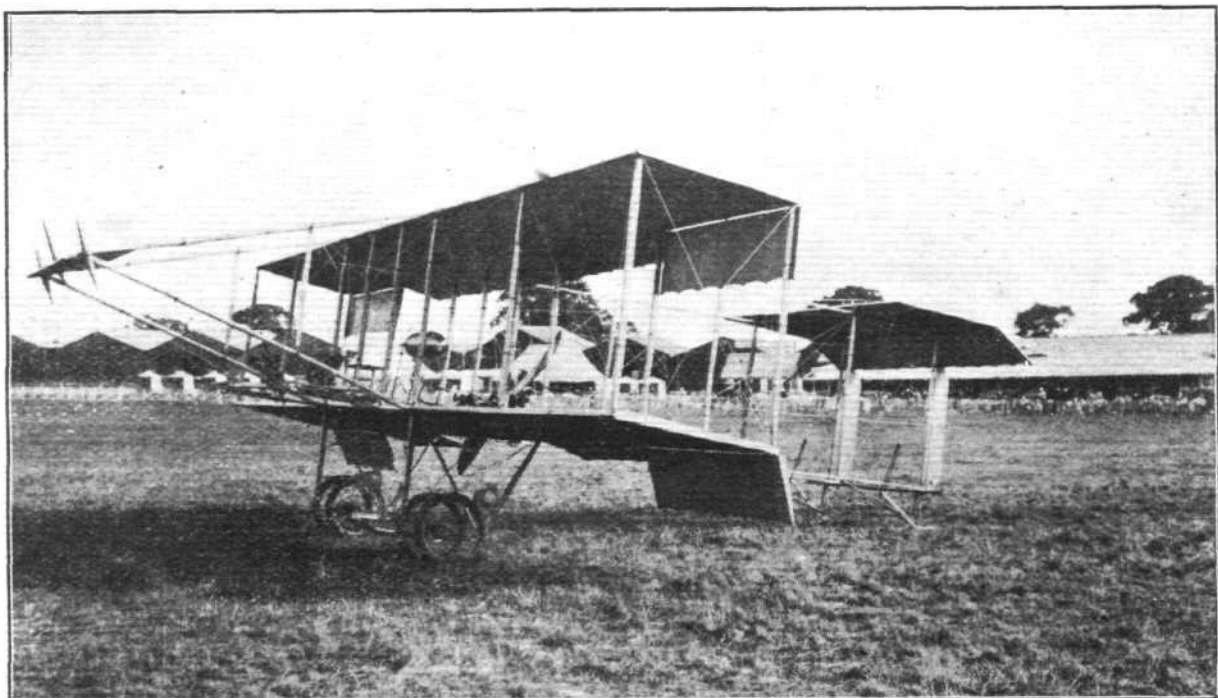
THE choice of engine will depend to a great extent upon the course designers will wish to take. Two distinctly opposite lines are open: The first will be to use the smallest engine which will take the machine around the course at 50 m.p.h., carrying the stipulated minimum useful load,

i.e., 340 lbs., representing pilot and passenger. At the other end of the scale we may find designers who believe that higher marks can be gained by using the largest engine it is possible to get, within the 170 lbs. weight of course, and carrying a useful load greatly in excess of the minimum demanded.

IN order to assist in forming a mental picture of the sort of figures that may be assumed likely to be attained, let us suppose that one designer decides to use the smallest engine that can be counted upon to get his machine around at 50 m.p.h., say one of 30-35 h.p., and let us assume that this machine will average 30 miles per gallon. Then the 2,000 miles course will be covered on $2,000 : 30 = 66.66$ gallons. The useful load being the minimum demanded, this machine will obtain a figure of $340 : 66.66 = 5.1$ lbs. per gallon for the course.

LET us assume that another designer decides to attack the problem from the other extreme and to use the largest (*i.e.*, most powerful) engine obtainable for a weight of 170 lbs. By efficient design, it should be possible to produce an engine (we do not say this engine has been or will be produced) of this weight developing 85 h.p. Then the same useful load per unit of fuel, as in the small machine, will be attained, *i.e.*, the machine will secure the same number of marks, if the useful load carried is 850 lbs. and the mileage per gallon is 12, or useful load 800 lbs., and consumption 12.8 miles/gallon, or 750 lbs. load and 13.6 m.p.g., or 700 lbs. load and 14.6 m.p.g., or 650 lbs., and 15.7 m.p.g., or 600 lbs. and 17 m.p.g., and so on. We do not envy aircraft designers their task of deciding which type is the more likely to give the highest number of marks. On the one hand, the small engine will probably weigh more per h.p., and its consumption be likely to be greater per h.p. than in the case of the large engine. On the other hand, it is doubtful whether the same useful load, *i.e.*, 10 lbs./h.p., can be attained in the larger machine. It would appear probable that the best results might be expected not at either extreme, but at some intermediate point.

THERE is, however, this fact to be taken into consideration, that as soon as one departs from the small engine, *i.e.*, the type of which we have by now had considerable experience, and which may be said to have proved itself, it will be a question of using new, and presumably more or less untried, engines. The Bristol "Cherubs" and the British Anzani engines did, on the whole, remarkably well at Lympne at the August Bank Holiday meeting, when they were being run all out almost the whole time. In next year's competition, there will not, except for strong head winds, be the same necessity for full throttle running, and the engines mentioned may be expected to prove reliable. The weight regu-



A PRE-WAR "LIGHT 'PLANE": It is interesting to note that this Graham White "box-kite," with its 50 h.p. Gnome engine, would be admitted as a light 'plane under the present definition of the term.

lation rules out the Airdisco "Cirrus"; otherwise, one would have in that engine a proved and reliable power unit.

WITH the regulations for next year's competitions as they are, it seems that the engine weight basis is not likely to do much harm, although we still think a better basis could have been provided. Or, as the fuel economy question has been given prominence, why bother to fix an engine weight limit as low (or as high) as 170 lbs.? In connection with this question of a suitable basis, Mr. W. O. Manning, the designer of the now famous "Wren" light plane, makes the interesting suggestion that it is possible to give everybody a fair chance without complicated rules, and with but one single restriction. Mr. Manning's suggestion is that all competitors should be given the same type of propeller, but should, for the rest have an entirely free hand in design of machine, choice of engine, &c., with the one proviso that the propeller must not be run at more than a certain specified speed, say, 3,000 r.p.m. on the ground, and perhaps 3,200 r.p.m. in the air. This, he maintains, would automatically limit the power used, since the propeller would only absorb a definite maximum, and would still leave designers the choice of whether they would use a direct drive engine running at 3,000 r.p.m., or a geared engine running at higher speed. He suggests that

"standard" propeller might have the effect of limiting the choice of engine.

WE have repeatedly referred in FLIGHT to the problem of the light plane club members who have obtained their "A" licence, and how they are to get flying practice afterwards. It seems to have become accepted as a dictum that single-seater machines are not wanted by the clubs. We are not at all certain that this view is correct, and are therefore extremely glad to learn that the Newcastle club has secured the Gnoss-pelius "Gull." This machine is of very unorthodox design, but should provide a great deal of valuable experience in one way and another, and we could wish that the subject of single-seaters should be seriously considered by the clubs and by the Air Ministry.

IT is an incontrovertible fact that as soon as one adds a passenger the size of the machine goes up. So does the horsepower. And so, unfortunately, does the cost. Single-seaters could probably be obtained, if ordered in batches, for about £350 or £400, and should be of the very greatest utility for holders of "A" licences who wished to get in more flying practice. We appreciate that, from the point of view of cost of upkeep, a multiplicity of types is not desired, but there are

Four months' flying at the London Aeroplane Club.

Date	Total flights	Total flying time	Dual Control Instruction		Solo Flying		Instructor's Solo		Joy Rides	
			Total flights	Total flying time	Total flights	Total flying time	Total flights	Total flying time	Total flights	Total flying time
		h. m.		h. m.		h. m.		h. m.		h. m.
August (13 days) ..	158	67 0	130	62 45	—	—	24	2 35	4	1 40
September (23 days) ..	216	88 40	160	80 30	5	1 35	49	5 50	2	0 45
October (18 days) ..	158	63 55	111	49 55	19	11 5	28	2 55	—	—
November (18 days) ..	197	79 10	128	57 35	39	17 0	27	3 5	3	1 30
Totals ..	729	298 45	529	250 45	63	29 40	128	14 25	9	3 55

the Royal Aero Club should get a propeller expert to design this "standard" propeller, whose characteristics would be so chosen as to correspond to certain generally useful performances as to speed and power, and that the Club should then order a sufficiently large batch from some propeller constructor. Competitors would obtain their propellers from the Royal Aero Club, which would supply them to competitors at a small profit so as to guard the Club against loss.

THE suggestion is a most fascinating one, but it is to be feared that the simplicity of it must hide some "snag" or other. It would seem to have the advantage, apart from its very simplicity, of making all competitors start absolutely level and on a common basis. It would, it is thought, be equivalent, in this respect, to saying: "Here is an engine which must be used by all competitors; do your best with it," but would be better still in that it would not limit the choice of engine to one particular type. Thus everyone would be entirely free to please himself in the matter of engines, machine design and everything else. Indirectly the use of such a "standard" propeller would limit horse-power, fuel consumption, etc. The original design of the propeller would probably form a controversial subject, and in practice the

in existence several types of single-seaters, and engines suitable for them, which should prove extremely useful for "post-ticket" work, and the first costs and running costs of which would be very reasonable indeed; or, if the Air Ministry decided to help in the matter, one type could be chosen and ordered in batches. That the single-seater is useless and not wanted we do not believe, and there is certainly no cheaper way of obtaining solo flying.

At least two new "world's records" were established during the Russian glider meeting in Crimea held during September-October. The meeting, which had attracted something like 40 Russian gliders and seven German, seems to have been a success, and on October 2 the German pilot Schultz on the glider Moritz succeeded in remaining aloft for 12 hours 6 mins. 22 secs. We have often commented upon the futility of these "records," but one cannot withhold a great deal of admiration for the pilot who had the will and stamina to "sit on a jet of air" for that length of time. The other "record" to which we have referred was a distance flown of 24.4 kms. (15.2 miles), measured in a straight line. This flight was also made by a German pilot, Herr Nering, who piloted the famous "Konsul" monoplane glider.

LIGHT PLANE CLUB DOINGS

London Aeroplane Club

Owing to the fog, flying was only possible on three days, and then only for short periods. The total flying during the week was 8 hours 25 minutes.

Mr. G. T. Witcombe, pilot instructor, was still away, and the whole of the instruction was done by Mr. F. G. M. Sparks.

The following members were given flying instruction: H. Kennedy, R. C. Brighton, E. D. Moss, Col. Turner, E. K. Blyth, A. R. Ogston, E. S. Brough, N. Jones, R. C. Presland, J. S. M. Michie, J. H. Luxton, C. H. Gould, D. Kittell, Major Beaumont, C. H. Saffery.

The following members were flying solo: Maj. Beaumont, Mrs. Elliott-Lynn, G. N. Warwick.

The Lancashire Aero Club

FLYING took place on Wednesday, Thursday, Friday, and Saturday. Mr. Scholes gave dual instruction to A. Macnair, 40 mins.; S. Crabtree, 40 mins.; W. Caldcott, 25 mins.; J. Leeming, 30 mins.

Mr. Cantrill to: T. Wilkinson, 35 mins.; A. Goodyear, 1 hr. 20 mins.; H. Hardy, 45 mins.; P. Colley, 45 mins.; D. Tummers, 20 mins.; A. Annable, 15 mins.; P. Michelson, 20 mins.

T. Wilkinson made solo flights amounting to 50 mins. Tests occupied 40 mins. Dual, 6 hrs. 35 mins.; solo, 40 minutes. Total time flown, 7 hrs. 55 mins.

About 15 enthusiasts waited on Sunday for the weather to clear, but these were the little band who are always in attendance, and if they cannot be in the air, seem to prefer sitting in a hangar to anywhere else; they are also there early and leave reluctantly after dark. A hot battle with snowballs took place during the afternoon, and Mr. Stern, who was again clothed in his latest winter suitings, did some excellent shooting, eventually enabling his side to drive the Lacayo-Leeming forces into retreat.

The Midland Aero Club

OPENING day, October 7, 1925. Report for period October 7, 1925, to December 7, 1925:—

Instructors, 1. Flying days, 48. Days fit for flying, 33. Total hours dual flown, 82 hrs. Other flying, 7 hrs. Pupils' solo, 2. Pupils awaiting first solo, 1. Pupils taking regular flying instruction, 12. Active flying members, 36.

Owing to the necessity of incorporating various modifications in the machines, only five weeks of the above period was worked with both machines. This fact has cut down flying hours somewhat.

A refreshment room, also reading room, is provided for members.

No flying can be done on Saturdays owing to the fact that the Birmingham Parks Committee utilise the aerodrome for sports on that day, but as soon

as the agreement between the Air Ministry and the Birmingham Corporation is completed, flying will take place.

At the present moment the Moths are being used solely for dual instruction and qualifying solo, as it is considered that with existing equipment the club is not justified in using their dual machines for other than training purposes.

The Newcastle-upon-Tyne Aero Club.

FLYING report for week ending, Sunday, December 13, 1925. Total flying time, G-EBLX, 6-19, G-EBLY, 13-12, Total, 12-31 hrs. Instructional Flying with Major Packman:—Messrs. J. D. Irving (3 hrs.), W. T. Walton (3 hrs. 18 mins.), G. H. Twine (15 mins.), J. A. Somerville (72 mins (2 flights)) H. H. Leech (30 mins.), L. Smith (30 mins.), J. D. Bruce (1 hr. 30 mins.), C. B. Marshall (30 mins.), C. Thompson (35 mins.), W. Todd (30 mins.), J. M. Campbell (32 mins.).

Solo flying:—Mr. N. S. Todd (1½ hrs. (2 flights), Sunday), Mr. R. N. Thompson (20 mins.), Mr. W. M. Mackay (66 mins. (2 flights)), Mr. P. Forsyth Heppell (30 mins.), Mr. Baxter Ellis flew with Mr. Heppell as passenger for 1 hr. 12 mins. on Thursday, for 30 mins. with Mrs. Waugh and Mr. Allen (2 flights) on Saturday and for 1 hr. on Sunday. On Sunday, he took as passengers during one flight Mrs. Baxter Ellis and Master Herbert Ellis (aged 5 yrs.). The Moth may therefore, in company with the D.H.51, be considered an "occasional three-seater." Master Ellis was obviously delighted with the experience, and on returning to the hanger made some very "grown up" remarks to the engineer about it all.

During the week Major Packman flew with the following ladies as passengers: Mrs. Waugh, Mrs. Somerville, Miss Sheffield and Miss Jeffrey, the latter for 25 mins. Miss Jeffrey is becoming a regular passenger.

Many strange aeroplanes have arrived at the aerodrome during the week. Mr. Ellis's Gnosspeilus "Gull" on Wednesday and four Fairey III Ds landed for petrol on Friday. The "Gull" remained, but the Faireys left on Saturday morning. As the quantity of petrol required to satisfy these monsters is equal to 2 months' consumption of the two Moths, at the present rate of flying, there was not sufficient for them at the Aerodrome and by the time supplies were

received, it was considered too late to proceed on the journey. Everyone was pleased to see these machines, and the only "grouse" came from the Instructor, who said that an hour's flying had been lost through interest being transferred from Moths to Faireys.

Very few members of the Club have previously seen even a semi-cantilever monoplane. The remarks about the wings of the "Gull" being attached to the centre section by "pieces of tin" prove this. The machine has only about four supporters at present, and they are being subjected to quite a lot of abuse. Unfortunately, the machine has not been used for some time and has at present a rather dilapidated appearance and a lot of dust has accumulated in and on it, also one or two holes have arrived in the fabric and perhaps, for the moment, she does not look very pretty. Possibly it is best left at that. Mr. A. H. Bell spent Sunday in cleaning it up and receiving uncomplimentary remarks. Even Mr. Ellis prefaces his remarks by saying "if it flies." We must wait and see.

That perseverance gets there was proved in two ways on Sunday. Only two members of the Club have had very good opinions of the "Self-starter" on the Moth, all along. On a previous occasion when the engine of one machine stopped, during a very severe side slip to the left, the lever was only pulled once, and did not start the engine.

During one of his flights on Sunday, Mr. N. S. Todd caused the engine to stop, by sideslipping when throttled down. Being at a fair height, he tried to dive to re-start, without success. He pulled the lever once, nothing happened, the same on the second "pull," but the third effort was successful and he flew quite a long time after that.

One member who was being taught the effect of certain evolutions, during his training, felt that he wanted something to "hang on to." He seized the joy stick, but states that this cannot be the correct thing to do, judging by the remarks which came through the telephone from the Instructor.

G-EBLX was out of commission during most of the week, while the spare Cirrus engine was being fitted. The original engine (No. 13) will now be overhauled.

A record for one day's flying was made on Sunday by completing 7 hrs. 22 mins.

THE WEATHER MAP*

The first edition of the Weather Map was published in 1916 for the benefit, primarily, of those who were making use of meteorology in the late war. Since then the book has been enlarged, but in this, the sixth issue, only slight amendments such as were needed to bring it into harmony with present practice have been introduced. A note on visibility has been added on p. 23. The book opens with a detailed account of the method of constructing weather maps, illustrated by charts showing the distribution of the weather, winds, temperature and pressure on the same day, August 2, 1915. The sequence of weather and its classification according to a few simple types of pressure distribution are next dealt with, two examples being given of the effect of notable cyclonic depressions which have passed over the British Isles, illustrated by a series of maps. The upper air and the conditions prevailing there are then shortly described. As a supplement climatic summaries are given for London, Paris, Balkan Peninsula, Mesopotamia, Egypt and East Africa, as representing the types of climate in the various theatres of war, together with a series of isopleth diagrams of the mean temperature, pressure, wind, rainfall and humidity at the four observatories of the Meteorological Office. The climate of the British Isles is further illustrated by charts showing the normal distribution, in January and July, of day and night temperatures, bright sunshine and rainfall. Copies of the publication are obtainable from all branches of H.M. Stationery Office or through any bookseller, price 1s 3d. net, postage 1½d. extra.

* *The Weather Map (Sixth Issue): An Introduction to Modern Meteorology.* By Sir Napier Shaw. Published by Meteorological Office, Air Ministry.

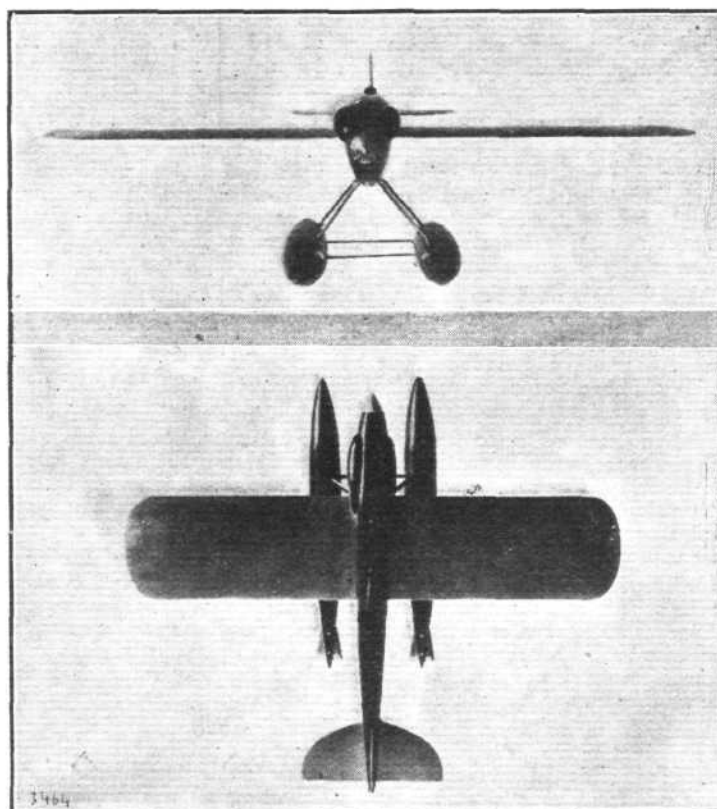
The "Kingston" Flies from Lytham to Felixstowe

THE new metal-hull flying boat "Kingston," produced by the English Electric Co. of Preston—and which we briefly described and illustrated in our issue for December 3 last—was delivered by air, from Lytham in Lancashire, to the R.A.F. air station at Felixstowe during this last week-end. Piloted by Flight-Lieut. B. H. C. Cross and with a Service crew aboard, the "Kingston" left Lytham at 8.45 a.m., on December 12, and, passing Pembroke Dock at 11.15 a.m., arrived safely at Plymouth at 1.33 p.m. Leaving Plymouth at 11 a.m., Monday, December 14, the "Kingston" completed the remainder of the journey without incident, landing at Felixstowe at 3 p.m. The total distance flown along the coast from Lytham to Felixstowe is about 850 miles.

A "Moth" for Chile

THE De Havilland Aircraft Co. have just completed at Stag Lane a D.H. "Moth" biplane, fitted with an A.D.C. "Cirrus" engine, for Messrs. Morrison & Co., a well-known firm of Chilean merchants. Capt. H. S. Broad put the

machine through its tests on December 9. We understand the "Moth," when it arrives in Chile, will be employed for training purposes.



A SCHNEIDER CUP CHALLENGER WHICH DID NOT MATERIALISE: These two photographs of a wind tunnel model have been sent to us by the Dornier Co. of Friedrichshafen, with the information that the Italian "Commissariato d'Aeronautica" stated that wind-tunnel tests on the model in 1924 indicated that the aerodynamic qualities of the machine were such as to give it an excellent chance in the Schneider Cup race. The actual machine was not constructed, however, as the subsidy granted by the Italian Government was insufficient to meet the expense entailed. In the model the wing bracing appears somewhat sketchy and the float shape, although probably of low air resistance, would appear open to criticism.

ALL-METAL FLYING-BOAT HULLS

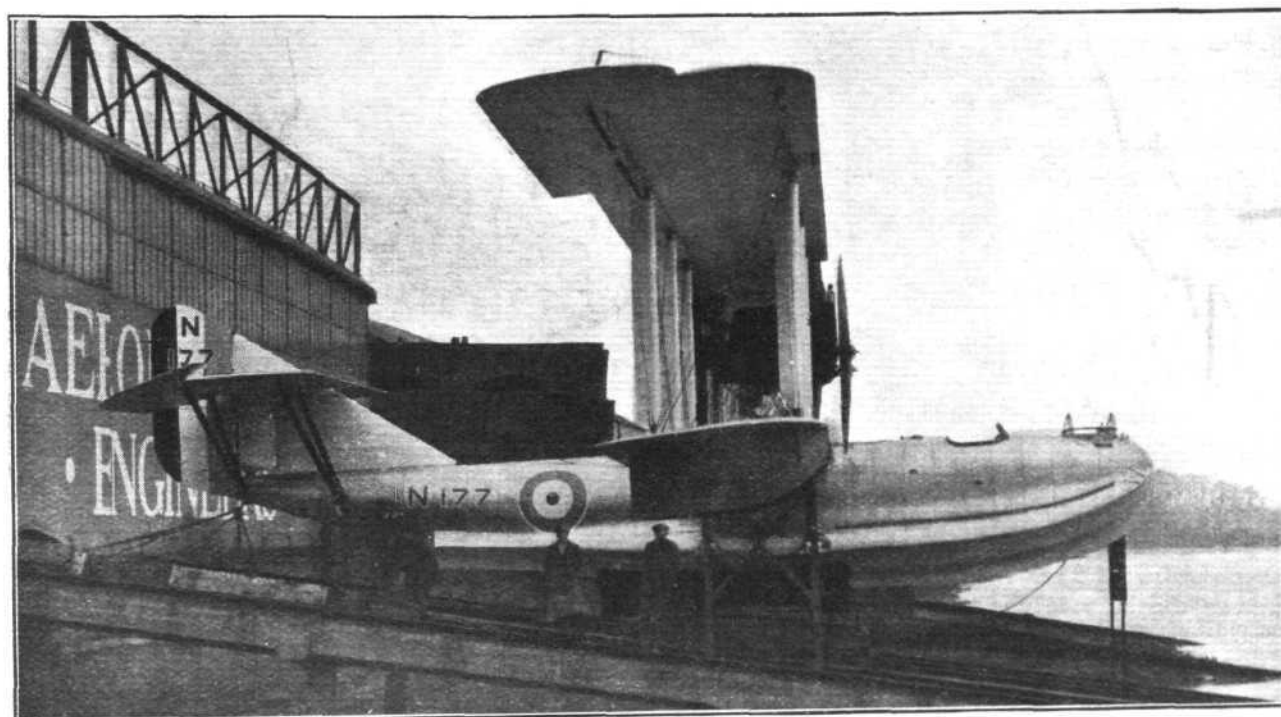
CONCERNING the illustrated article dealing with the English Electric Company's "Kingston" flying-boat, published in our issue of December 3, 1925, we have received from Mr. Oswald Short, Managing Director of Short Brothers, Ltd., the following letter:—

"We have read with interest the article in your issue of December 3, describing the metal flying-boat produced by Messrs. The English Electric Co., and we join with you in

Brothers designed and built the first all-metal flying-boat for the British naval air service, and that this boat had a fluted under-surface of the kind in question.

"The enclosed photographs show the boat we refer to, and it is interesting to note that it was launched twelve months ago, and has now been on active service for that period, with entirely satisfactory results.

"It was not our fault that this first example of a large



A SHORT F.5 WITH ALL-METAL HULL: Note the fluted planing bottom. This photograph of the machine was taken on December 22, 1924.

congratulating this company on what is apparently a very creditable example of British engineering skill.

"There is one statement in your article, however, which we feel is open to objection on our part. It is to the effect that the designer of the machine has worked on entirely original lines in constructing a metal hull with a fluted under-surface.

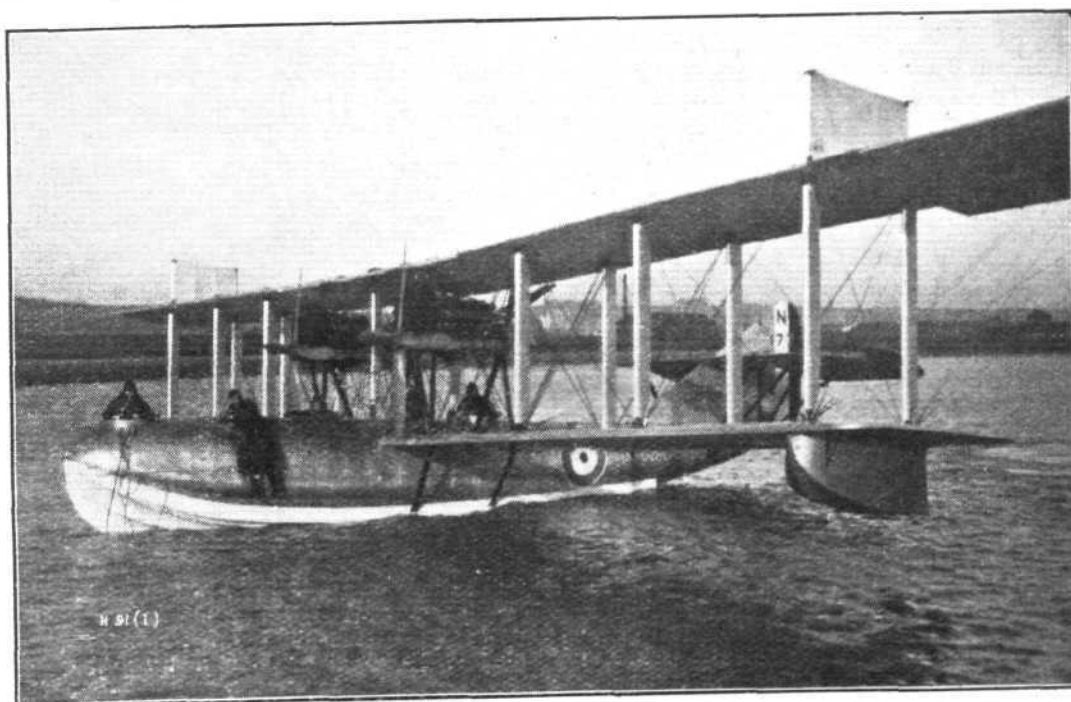
"It is well known in this country that Messrs. Short

all-metal boat of British design and manufacture was fitted with the obsolete F.5 upper structure shown in the photographs.

"It went very much against the grain with us that we were not allowed to re-design the upper structure in accordance with modern ideas.

"The policy of the Air Ministry, however, was to try one experiment at a time, and to test a metal-built hull on a

The Short F.5 with all-metal hull: Photographed on the water after a flight on January 5, 1925.



superstructure of known characteristics, so that a strict comparison could be made between a metal and a wooden hull as they affected the performance of the machine. So far as the fluted bottom is concerned we were the first to carry this feature into practice in connection with aircraft.

"In 1916 we built a pair of seaplane floats with a single fluted under-surface, and in 1917 we submitted to the Air

Ministry the design of a large three-engined twin-hulled flying-boat, the hulls of which we proposed to construct with a plurality of flutes on the under-surface.

entirely of duralumin we were met with doubts and fears in almost every quarter. It was only by building a complete machine at our own expense that we were able to demonstrate that these fears were not justified. This machine was exhibited at Olympia in July, 1919, having been designed and built in the short space of five months.

"In 1922 we laid before the Air Ministry the designs of a

First British flying-boat with all-metal hull: The Short "Cockle" single-seater monoplane, with two Blackburne engines, photographed on the Medway at Rochester on September 18, 1924.



Ministry the design of a large three-engined twin-hulled flying-boat, the hulls of which we proposed to construct with a plurality of flutes on the under-surface.

"The idea of the fluted bottom was to give rigidity and save weight, which it does by reducing the amount of buttressing required inside the hull. In actual practice we have found that this form of hull is very clean when running

large all-metal boat, which was almost an exact replica of one for which we recently received an order from the Air Ministry, and which is now nearing completion in our workshops.

"The first all-metal boat actually built in this country was completed by us in September, 1924, and is shown in the accompanying photographs. It is a single-seater mono-



The Short "Cockle" being launched from the slipway at Rochester on March 20, 1925.

on the water, and gives, if properly designed, a very low hump resistance.

"Now that other British aircraft makers are adopting duralumin as a material of construction for aeroplanes and flying-boats, it is perhaps permissible to point out that our firm has been entirely instrumental in bringing about this interesting state of affairs.

"When we proposed in 1918 to build an aeroplane almost

plane fitted with two Blackburne engines of 760 c.c. capacity developing 16 maximum h.p. at 3,000 revolution.

"The system of construction which we have used from the start, and which is protected by various patents, differs entirely from the methods adopted by foreign constructors who have built metal flying-boats.

"It is not wooden boat construction copied in metal, but a new system, which lends itself readily to sub-division and

mass production methods. We expect our latest hull to show a saving of 25 per cent. in weight as against a wooden structure in the dry state, and when the water soakage of a wooden hull (after it has been in service some time) is taken into account, the saving of weight is much greater. For instance, it was found that our 'Cromarty' flying-boat, built in 1920, absorbed over 600 lb. weight of water into her planking after being a few weeks in service. Another advan-

tage of metal construction is the absolute water-tightness of all joints, so that a perfectly dry hull is maintained, the usual hard labour at the bilge pump is quite dispensed with.

"In view of the great interest now being evinced in metal construction for aircraft we trust this letter may be of sufficient interest to find space in your valuable columns.

"SHORT BROTHERS (ROCHESTER AND BEDFORD), LTD.

"(Signed) OSWALD SHORT, Managing Director."

PERSONALS

Married

ALAN ROWLEY CROSTHWAITE, D.F.C., younger son of Herbert F. Crosthwaite, of Oatlands Park, Weybridge, was married on December 7, at Eshowe, Natal, to EVELYN SOPHIA MORRIS, daughter of the late Westcott Mallet Morris, of Kokstad, East Griqualand, and grand-daughter of the late Major James Giles, 14th Hussars.

The marriage between Flying-Officer R. T. F. GRACE, M.B., R.A.F., and Miss LUCY MACKAY took place at St. Andrew's Church, Frogna Lane, N.W., on Tuesday, December 15, at 2.15 p.m.

To be Married

The wedding of Flying Officer PATRICK JOHN BETT, R.A.F., late the Gordon Highlanders, eldest son of Mr. and Mrs. David Gordon Bett, of Hasketon, Woodbridge, Suffolk, and Miss ELLEN GERALDINE TOWGOOD, only daughter of Mr. and Mrs. ROBERT L. TOWGOOD, of Farm Hall, Godmanchester, Huntingdon, will take place to-day, Thursday, at St. Mary's Church, Godmanchester.

The marriage arranged between Air Vice-Marshal BROOKE POPHAM and Miss OPAL HUGONIN will take place at All Saints' Church, Ledsham, Yorkshire, at a quarter past two o'clock on the 5th of January, 1926.

The engagement is announced, and the marriage will shortly take place, between JOHN SYDNEY ("SOLLY") NEWALL,

R.A.F., only son of Mr. John Walker and Mrs. Newall, of Ongar, Essex, and ALFREDA MARGARET, younger daughter of Mr. ALFRED and Mrs. HEWLETT of Parbold, Lancs, and Haseley Manor, Warwick.

The engagement is announced between Flight-Lieut. CHRISTOPHER THOMAS O'NEILL, O.B.E., R.A.F. Medical Service, youngest son of the late Mr. John O'Neill, J.P., Sarsfield Court, Riverstown, Glanmire, Co. Cork, and JANE DOROTHY LAING, daughter of the late Mr. William Laing, Nairn, and of Mrs. Laing, 30, Murrayfield Avenue, Edinburgh.

A marriage has been arranged, and will shortly take place, between Flight-Lieut. CEDRIC PORTER, only son of Mr. and Mrs. Francis Porter, of Helmsley, Yorkshire, and Mrs. C. C. DENISON, The Manor House, Bosham.

Killed

CAPTAIN SIDNEY GEORGE REILLY, M.C., late R.A.F., was killed on September 28, near the village of Alleköl, Russia, by G.P.U. troops.

Item

THE Italian Ambassador on December 14 entertained at luncheon at the Embassy the Marquis de Pinedo, the well-known Italian aviator, and his mechanic, Signor Campanelli. Among those present were the Right Hon. Sir Samuel Hoare, Secretary for Air, Sir Philip Sassoon, M.P., Air Vice-Marshal Sir Geoffrey Salmond, and Squadron Leader E. R. Boyle.

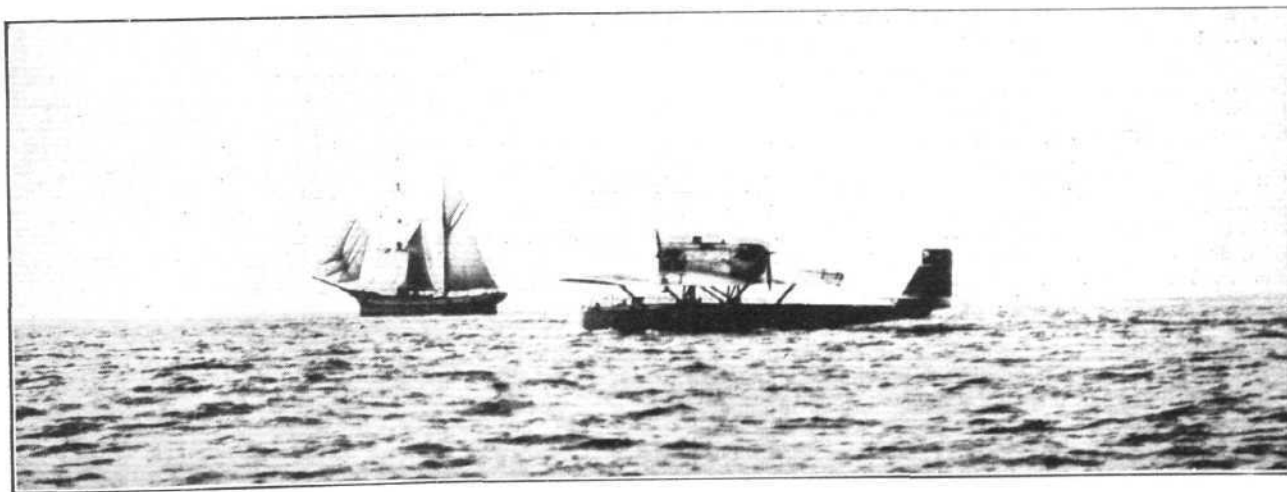
London-Cape Town Survey Flight

We have received the following messages from Alan J. Cobham, from Cairo, who is making slow but very sure progress on his journey to Cape Town in the D.H. 50 J. (Siddley "Jaguar"):

"Machine and engine are in perfect order and doing well. Wonderful reception by the R.A.F. officers. . . . The Press here have gone mad over aviation, and devote whole front pages to Imperial Airway Survey Flight. . . . Impossible to hurry as everyone wants us to stay a week if we

would. . . . Shall do all business on the outward trip, and try and make a dash flight back. . . . Regards to all at FLIGHT Office. A. J. Cobham."

From which it will be seen that "Alan J." is finding much to be done in the matter of future schemes in connection with air routes in this part of the world. During his ten days in Cairo he has seen numerous heads of departments and other leading officials regarding possible Imperial air routes. By the time these lines are in print he will probably be at the next stage of the journey—Luxor.



ANCIENT AND MODERN: This photograph shows a Dornier "Wal" with two Napier "Lion" engines and is to be used by Commandant Franco for a flight across the Atlantic via Seville, Cape Verde, Pernambuco, and Buenos Aires, and, possibly, if all goes well, the tour will be continued around the world. The Commandant will be accompanied by Artillery Captain Ruiz Alda, as navigator, and by a mechanic, and hopes to commence his trip early in the New Year. The Dornier "Wal" has an empty weight of 3,500 kgs. (7,700 lbs.) and a useful load of the same amount. Its range is stated to be 3,000 kms. (1,865 miles), and the top speed is given as 205 kms. (127 m.p.h.).

AIR SURVEYING 15,000 SQUARE MILES OF FOREST IN BURMA

IN our report on Major C. K. Cochran-Patrick's Paper, "Air Surveys in Burma," read before the Royal Aeronautical Society recently, which we published in our issue of November 5, we made only passing reference to that section of the paper dealing with the forest stocking of 15,000 square miles of South Burma. As we stated at the time, we had not then the space for a full quotation of Major Cochran-Patrick's very interesting story of this section of their activities in Burma but promised to give our readers the full account on another occasion. This week, therefore, we publish this section of Major Cochran-Patrick's paper, and think our readers will agree that it makes interesting reading.

"The Tenasserim Reconnaissance area surveyed which stretches from Heinze Bay to Victoria Point, consists of a long narrow strip bounded by the coast to the west and the high hills of the Siamese border to the east. There are only three towns of any importance in the area, Tavoy, Mergui and Victoria Point. These are connected by a weekly steamer service with Rangoon and a fortnightly service from Mergui to Victoria Point which calls at Karathuri.

"Besides this main service and local motor-boat services for short distances up the Tavoy River and along the coast to a point about 60 miles south of Mergui there is absolutely no regular communication and only indifferent tracks between native villages. As it was important to economise in flying time it was obvious that we would have to work from a series of bases. We had therefore to arrange to be self-supporting and self-transporting. For this purpose, Mr. Kemp brought out from England a converted naval pinnace boat which had been fitted with a paraffin engine. She was capable of doing eight knots, of standing a reasonable amount of bad weather, and of sleeping, besides native crew, two Europeans comfortably or four at a pinch.

"We had contracted to undertake a certain number of flying hours and to photograph an area of not more than 600 sq. miles of forest reserve near Heinze Bay. The flying hours were to be occupied in taking a forest officer over such area as they required for the purpose of making a forest stock map by sketching on to existing maps. The forest officer in charge had the option of converting square miles of photography into hours flying time at a pre-arranged rate if, after trying both, he considered that the sketching method was more satisfactory for the work in hand than the photographic.

"The forest officers with whom we had to work were Messrs. C. W. Scott and C. R. Robbins, who were responsible for the stock mapping of the Irrawaddy Delta. These gentlemen spent a month or two examining small portions of the area on foot in order to get some preliminary idea of the type of timber that they might expect to find, and it was arranged that we should meet them at our first base in Heinze Bay.

"The party therefore consisted of the two forest officers and myself, who took our tents and lived ashore. Mr. Bishop, our foreman fitter and also captain and navigator of the launch, and Mr. Andrews, the photographer, lived on the launch. One aero engine native fitter, who acted as engineer for the launch, and various native crew and boys were housed where most convenient. We also took two native photographic assistants to the first base, where the bulk of the photography was to be done.

"On January 10 Kemp left Rangoon with the launch loaded with petrol and gear for Heinze Bay and three days later I flew the machine down without incident. The site of our first base was alongside the only piece of hard beach in Heinze Bay, which is in general surrounded by mangroves and mud. The water only reached this bit of beach over the mud after three-quarter tide. As it was important to be able to work at all states of tide the seaplane had to be moored out. The forest officers had both arrived by dug-out before the aeroplane and had got their camp pitched, and Kemp left for Rangoon via the Tavoy River the day after I got down. Cloud conditions were not very favourable, but we succeeded in photographing two areas of 100 sq. miles each and in doing the first sketching flights without much delay.

"It was then decided to transfer the remainder of the photography to reconnaissance time as it was found that a sufficiently high order of accuracy could be attained by sketching for the particular work in hand and the very considerable additional cost of the photography, when taken on a square mile basis, was not justified.

"This principle having been decided, a definite programme of work was drawn up in order to avoid all possible waste of flying time.

The problem divides itself into three parts:—

- (a) Safety.
- (b) Visibility of detail, and
- (c) Map reading and sketching.

"From the point of view of safety, in all but the most ideal country one should of course, fly as high as possible in order to have a maximum choice of landing grounds. For visibility of detail, on the other hand, the lower the observer flies the more he sees, though there is a definite limit to this as at a very low altitude the tendency is to lose sight of the wood for the trees.

"The third factor of map reading and sketching comes between the other two and is finally the governing factor. The larger the scale map used the more difficult it is to read from the air. The higher and slower one flies the easier it is to read any map.

"Therefore for a given scale map and a given cruising speed there is a definite height below which an observer has not time to read his map and the minimum height is considerably increased when he has also to find time to sketch in detail on the map.

"Actually we found 8,000—10,000 ft. to be the most suitable height for the work in hand. It was the cruising ceiling of the particular machine we were using, and therefore complied to the maximum possible with the safety clause. Robbins found that he could see all the detail required with ease, in fact when we got the second machine later on, which went to 13,000 ft., he found that he could still see all necessary detail from that height. On the other hand, with the wonderful general view of forest seen from 10,000 ft, there was no temptation to endeavour to put in too small items of detail which would have been irrelevant to the particular needs of this reconnaissance. As regards map reading and sketching, the ideal aimed at was to do all work in a series of straight lines without having to resort to circling. Working at 80 m.p.h. on one inch maps at 10,000 ft. it was found that in virgin forest where types stretched over big areas without much variation, the observer could work on both sides of the machine. In areas where cultivation had occurred or types were very mixed, the observer worked on the one side only. It was very occasionally that any circling had to be done to give time for filling in even the most complicated detail.

"The programme for each flight was carefully worked out beforehand and usually consisted of a straight flight out and a series of parallel short strips at right angles to this working back to the base and forming an area like the section of a fan. These sections, when joined together fanlike with our base as the handle, formed the most economical method of covering the area.

"The photography and reconnaissance for the northern section was completed in this manner in eleven days during which we made nine flights. Kemp had intended to reconnoitre a site for our next base at the Tavoy mouth on his way to Rangoon, but as we received no news from him we flew down and inspected the spot from the air. The ideal position lay behind some islands, but the channels looked shallow and we were doubtful as to whether our launch could get in so we decided to try outside. The machine was brought ashore and the floats repainted, oil changed, etc. Scott then went off by dug-out to work his way down to Tavoy mouth with the tents and heavy gear. Robbins and I filled the seaplane with kit and a heavy anchor in addition to the usual one and, leaving the launch to follow, flew south. We landed and found a strong tide running out. The light machine anchor did not even slow up our drift. The heavy anchor, a 76-lb. one, was put down as quickly as possible but we still drifted. A native boat chose this awkward moment to get upstream of us and then lose control. We just managed to keep him clear of the planes, and while Robbins broke our paddle on the steersman's back I borrowed their anchor which happened to be a good big one. The third anchor stopped our drift and we had a chance to get everything shipshape on the turn of the tide.

"Nevertheless, we decided to cook and sleep on the machine in case of accidents. Luckily our triple anchors held and the night passed without any more drifting. Next morning Robbins went off and found that the channels behind

the islands were possible for our launch, so with the next slack tide we organised a team of dug-outs and were towed to an excellent anchorage. That night both Scott and our launch arrived.

"At this our second base we had a bad spell of haze, but as this section was a small one, ten days sufficed and we moved down to the Tenasserim River. On this occasion Scott managed to catch the Rangoon steamer on its way to Mergui and was consequently able to go ahead and select a base. A variety of possible sites were chosen on the map and he was to light smoke fires at the one he had selected.

"We made a dump of petrol at Tavoy mouth and put down a mooring buoy, hauled up the machine on a convenient beach and again overhauled the floats and on February 9 Robbins and I again left by air to follow Scott. Our third base was about 15 miles up the Tenasserim River behind Mergui. It was the first place on the river where there was anything approaching a hard bank, as excepting Mergui itself the Tenasserim mouth lay in mud and mangroves. Mergui itself was out of the question as the harbour there was an open roadstead liable to very bad storms.

"The weather at this base was very good and some of the longest flights were done from there. Twelve days' stay and seven flights completed our work from Tenasserim and we then moved south to Karathuri without taking the machine up as we considered the bank to be too bad. This, our last base, was both the best and the worst. The anchorage which we chose from the air was behind a reef of small islands on the coast of one of the larger islands off the mainland, in consequence there was no bad current and the water was clear. We had a firm gently sloping beach and a beautiful camping site by the shore. We were, however, far from communication of any sort with the exception of the fortnightly steamer running to Victoria Point, which passed within a mile. Robbins and I waited here three days before the launch arrived towing a country boat loaded up with our tents, etc. During this wait we were royally entertained by the local headman, who insisted on our sleeping in his house. Immediately after our arrival the weather became bad. Haze in the morning turned to low clouds during the day, and though we arrived on February 22 it was not till March 13 that we managed to do a really good day's work. On looking over the engine after the flight our fitter discovered that our crankcase was cracked from the cylinder base practically to the bottom of the sump. I at once despatched the launch to wire to Kemp for another machine and a spare engine. The photographer and myself remained behind to remove the damaged engine.

"This we did successfully by rigging tackle on a convenient mangrove tree under which we could float the machine on a high tide. On the 20th Kemp arrived with the second machine, and the launch arrived two days later with the spare engine. On the 25th the weather improved, and we completed the reconnaissance by the 28th. As there was still some flying time due this was reconverted into photography, and sample strips were chosen at regular intervals right across the area from east to west to act as checks to the reconnaissance. On April 3 Kemp flew the original machine with the spare engine fitted back to Rangoon. We completed the photographic strips, and Robbins and I left for Tavoy Mouth on April 8. During the latter part of our stay at Karathuri Bay we had had very bad thunder-storms every evening. Now a cyclone broke off the Madras coast, and the tail of it was felt in South Burma. On our way north we were flying at times with 40 degrees drift; we had, moreover, on board the biggest load we had flown with, as besides our usual gear when on the move we were carrying the camera and a full complement of plates, because we intended to take a photographic strip before the launch caught us up. On landing we found a terrific current running with, even in our

sheltered anchorage, a strong wind blowing right across it. The current had carried the mooring buoy, which we had left right under water, so that we had to rely on the light anchor we carried in the machine. This, of course, dragged at once, but some local dug-outs edged us towards a firm sandbank. Here it held for about an hour after which the rope broke. We were rescued and man-handled along the shore to our mooring buoy, which had by this time reappeared above water. We spent the rest of the day rescuing the machine, which dragged its anchor, an eighty-pound one, four times. On the morning of the third day, however, she finally broke her last anchor rope, a 4-in. coia, and we lost our big anchor. We were on the point of abandoning the machine, as she was within a couple of hundred yards of 6-ft. breaking waves, having practically drifted out of the shelter of our island, when a big sailing boat managed to get us a towline and we were towed into safety. Having had enough of the sea, we turned out the local village and dragged the machine up some planks above high water. Next day the launch arrived, having had to turn back three times owing to weather.

"The following morning was fine, and we managed to do the necessary photography, and that afternoon Robbins and I flew up to our last base at Heinze Bay to take the last photographs, and then wait for the launch with petrol to enable us to fly back to Rangoon.

"On arrival at Heinze Bay we found the spot deserted except for one old fisherman and his family; moreover the huts which we had left had all been demolished. We therefore camped in the open, but, unfortunately, it started raining at about 2 a.m. Next morning was fine enough for us to dry our clothes, but as we were discussing the possibility of a flight it started raining again and we billeted ourselves on the fisherman, where we spent the night. By this time the launch was overdue. Next day it was still raining, and by midday, as something had obviously happened to the launch, we decided to use the remainder of our petrol to get us to Rangoon. We therefore dodged various thunder-storms and got to Rangoon for tea, where we found that the launch had broken down in the Tavoy River.

"We arrived in Rangoon on April 14, three months and one day after flying down to start the work, and in that time we had stock-mapped, according to my latest information from Burma, 15,178 square miles. This was done in 57 hours 14 min. of actual reconnaissance flying, or 265 square miles per hour. Besides this, and not counting photographic flying, we did 8 hours 25 min. on check flights, tests, etc. If we include this necessary flying time it brings the average to 231 square miles per hour. The stocking was done on the Survey of India 1-in. scale maps of the area, which had been cut up and pasted on to cardboard sheets of suitable size. Type boundaries and the areas covered by different types were marked in the air by different coloured chalks and, where time permitted, remarks were written in giving further details.

In all, thirteen different general types were used, and there is little doubt that only a highly-skilled observer could have dealt with this big variety on the scale used at the high rate of square miles per hour actually accomplished. Mr. Robbins, besides being an extremely efficient forest officer, had, during the war, been one of our best artillery observer pilots. He had then gained the experience which enabled him to read the 1-in. scale maps at the speed recorded, and with the high order of accuracy which appeared when the aerial stock map was compared with certain test areas which had been stocked on the ground.

"In conversation with forest officers and others concerned, I gathered that the work we had completed in three months by the field would have taken about twenty years if done in the forest staff usually allotted to an area of that size."

a saving also is made in packing, as lighter cardboard cases can be employed when the silk is carried in an aeroplane.

Aircraft on Liners

An Italian shipping company is building three Atlantic liners which will be fitted with run-ways for seaplanes, in order that the latter may be launched from the liner at sea when 1,000 miles or so from port (New York, etc.), and thus reduce the sea passage by about two days. In this way passengers who are pressed for time will, by paying extra fare, be able to reach their destination this much sooner than the liner's normal time of arrival at port. The seaplanes—about four of which will be carried—will accommodate ten passengers each. The first of these liners, the "Saturnia," is to be launched this month.

Dr. Eckner's Zeppelin Subscription.

DR. ECKNER is apparently receiving a ready response to his appeal for funds to build a Zeppelin for scientific exploration. Over £50,000 has already been subscribed and there are still returns to come from Baden, Bavaria, and parts of Prussia.

Silk By Air

FOR some time past considerable quantities of silk have been exported by air from France, the aeroplane having been employed as the means of transport owing to the fact that the British and French ports are in a very congested state as a result of the silk duties, and that several days are saved if the silk is sent by air. Furthermore,

THE RICKENBACKER COMMERCIAL AERO ENGINE

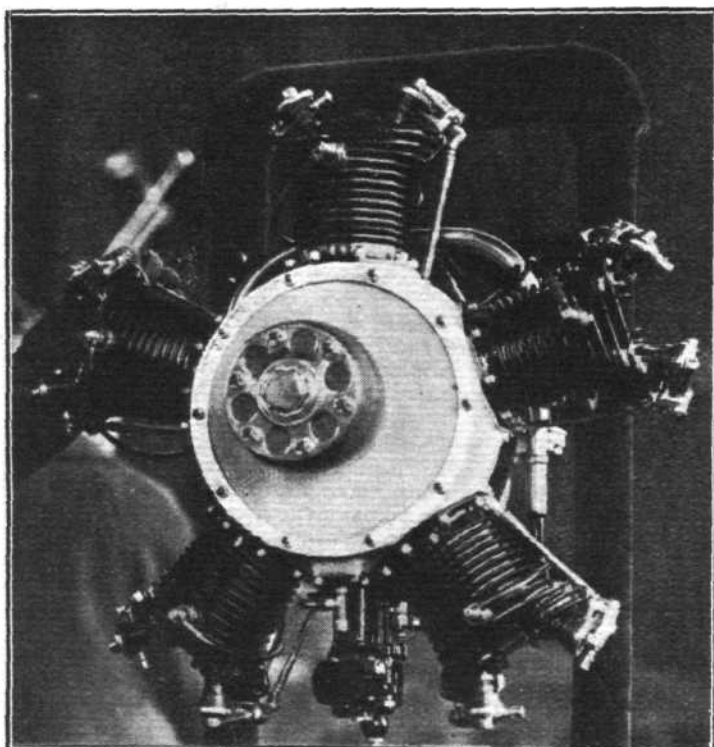
A New Air-Cooled Radial of American Design

DURING the New York Air Races, which were held at Mitchel Field, New York, last October, a number of aeronautical exhibits were on view in one of the hangars, and one of these exhibits, which attracted a considerable amount of interest, was the new Rickenbacker commercial aero engine, developed by Capt. Eddie Rickenbacker—one of America's well-known "Aces" in the Great War.

This engine has been designed and developed to fill the need for a simple, light, durable and inexpensive engine for commercial aircraft.

The engine is a five-cylinder of the air-cooled, radial type, and develops 60 to 80 h.p. It weighs less than 175 lbs., and is under 30 in. in overall diameter. It has less parts than the average motor-car engine, and may be repaired by a mechanic of ordinary ability. The cost of construction is comparatively low, due to the extreme simplicity of the motor. The selection of the air-cooled, radial type for the attainment of the desired features is the result of several years of study of all parts of aircraft engines by Capt. Rickenbacker.

In the opinion of Capt. Rickenbacker, although radial



The Rickenbacker Commercial Aero Engine: This is an American air-cooled radial developing 60-80 h.p. and weighing about 175 lbs.

engines are not new, their development has never progressed very far, and the more conventional, vertical and Vee-types were naturally chosen for military aeroplanes during the war when emergency demanded quick production.

The features of the radial type for aeroplanes were, however, appreciated even during the war, as evidenced by the fact that a great deal of work had already been done on developing this type of motor before hostilities ended. This work has continued, but mainly for military purposes, and with but little—in comparison—thought of commercial aviation.

Capt. Rickenbacker has developed his new engine on the basis of this past experience, and with the added consideration given to simplicity and durability for practical commercial use.

The engine has been tested for six months, and has proved even better than Capt. Rickenbacker, himself, expected. However, he is making no elaborate claims as regards performance until it has shown its qualities in the air. It is not expected that this engine will greatly exceed others in its category in regard to power output per cubic inch piston displacement, nor will it be the lightest possible weight for its power output. It will, however, be economical in the

consumption of fuel and oil, and will continue to run satisfactorily many hours after a lighter-weight engine of approximately the same horse-power would demand overhauling.

The cylinders are cast individually from the best grade of cylinder-iron—the cooling fins of the circumferential type being cast integral. Single inlet and exhaust valves are placed directly in the spherical-shaped combustion head; their axes being inclined to the axis of the cylinder, so as to obtain the best possible conditions for cooling. Two spark plugs are provided for each cylinder.

The valves are operated through push rods by rockers, which are supported on the valve port flanges. The flanges with rocker arms attached may each be removed as a unit. The valve tappet clearances may be adjusted at the outer ends of the duralumin push rods.

The crankcase is a simple barrel-shaped aluminium casting which contains a cored passage serving as an inlet manifold. Directly back of each cylinder, there is attached to the crankcase a flange with a pipe leading to the inlet valve of that particular cylinder. The crankcase has one transverse wall containing a boss for supporting the rear crankshaft bearing. To the rear of this wall are the radially-disposed bosses receiving the guides for the cam followers, as well as bosses for the engine support studs, and a studded flange for supporting the gear-case. Forward from the transverse wall are the flanges and openings for attaching the cylinders, besides the carburettor flange and oil-drain connection located on the bottom.

The crankcase has a large opening in front which is sufficient in size to permit the crankshaft and connecting rods being inserted as a unit. Hence the connecting rods and crankshaft counterweights can be fitted before final assembly with the saving of considerable time. This large opening in front is covered by a plate which carries the ball bearing receiving the propeller thrust. Thus, simplicity and rugged construction is the feature of the crankcase.

The crankshaft has a single throw with a counterweight attached at each side. It is supported on two ball bearings; the forward bearing, as stated above, carries the thrust of the propeller. The usual taper and key joint for the propeller hub is provided in front, while at the rear is a driving slot receiving the shaft which drives the cam and other units.

The crankshaft is simple and light, weighing only slightly over ten pounds. It is, nevertheless, ruggedly designed and made from a suitable drop-forged alloy steel and heat-treated to obtain the best physical properties. The counterweights are securely attached and their use gives almost perfect balance to the rotating and reciprocating parts.

The drop-forged duraluminium connecting rods are of the articulated type—that is, for the top or number one cylinder, the rod and cap have full bearing on the crankpin and to these are attached the four linked rods of the other cylinders. The shanks of the rods have the usual H section and the master rod and cap are held together by four bolts which also locate and secure the pins supporting the inner ends of the linked rods. The bearing on the crankpin is of ample proportions and under full pressure lubrication. To begin with, the rods are of light weight and the loads are comparatively low, and since the babbitt is applied directly to the master rod and cap, the heat dissipating qualities of the bearing are of the best.

The pistons are made from permanent mold aluminium alloy castings and provided with cooling ribs underneath the head. There are three rings per piston, the lower one serving as an oil scraper, and the piston pins float in both rods and pistons. The pistons are assembled after the crankshaft with connecting rods are positioned in the crankcase—thereupon the cylinders can be attached to the crankcase.

The aluminium gear case, which is attached to the rear of the crankcase, supports the cam ring and the oil pump, as well as all gears for driving same. The gear-case may be removed and replaced without affecting the valve timing in the least, therefore when the engine has once been timed there need be no fear of getting it out of adjustment during inspection or while making repairs.

One of the unique features of this design is the single ring of three cams which operates all ten valves. In this feature alone, the construction has been greatly simplified and cost of production reduced to a marked degree. The timing of the cam may be very easily and quickly effected after the rear cover or breather has been removed. This rear cover sup-

ports an attachment for a shaft to a tachometer which reads the revolutions per minute of the engine. The carburettor is located below the crankcase.

The gear-case has integral mounting flanges for the two five-cylinder high-tension magnetos, and supports as well the gear and shaft which drives them. The magnetos work independently; one firing the forward spark plugs and the other the rear plugs—in all cylinders—hence there is a small possibility of a forced landing due to ignition failure. The couplings through which the magnetos are driven are capable of resisting or absorbing shock loads, and provide as well, a simple and ready means of adjustment.

The lubricating system is really quite simple and should require a minimum amount of attention. Pressure is provided by a pair of gears in a pump attached to the under side of the gear-case. The bearings for the shafts in the gear-case

and the bearings on the crankpin are under full pressure of the pump. The oil plug in the hollow crankpin separates and retains any heavy particles or foreign matter in the oil—thus minimizing the amount of wear on both bearing and journal.

The oil pressure may be varied up to 100 lb., per square inch if desired by regulating the load on the spring back of the relief valve. Oil passing the relief valve is returned to the inlet side of the pressure pump. Another pair of gears in the pump return the excess oil to an outside tank. The cylinders extend far into the crankcase and provide an oil sump between the two lower cylinders sufficient to retain and prevent excess oil from draining into these cylinders before being returned to the tank by the scavenging pump. The gears, pistons, and ball bearings on the crankshaft are lubricated by oil sprayed from the bearings and moving parts.

THE LATE E. T. BUSK

In presenting this memoir of Edward Busk to the public, Mrs. Mary Busk remarks that perhaps a mother is not the right person to write a biography of a beloved son, but that in her case the beauty of Edward Busk's character has acted as a deterrent force. In the natural order of things generally this could not be the case, but in this volume one perceives many instances where Mrs. Busk has restricted her better feelings lest she be thought egotistical. Her son's memory is fresh in the minds of many engaged in the aviation world today, and it is possible that at a later date his life may be incorporated in a collection of biographies of modern geniuses—for genius he undoubtedly was, as the present publication clearly proves; or else, perhaps, we may have another edition of this volume supplemented by Shane Leslie, a colleague of Busk at Cambridge.

One can only describe Busk as a prodigy in engineering. A letter written by him when ten years of age, and published in facsimile, is of extraordinary interest, displaying as it does a deep knowledge of the mechanism of railway locomotives. A year later an engineering firm replied in answer to a letter from Edward, asking him for an interview in order to discuss his letter, but his mother disposed of this by saying he was a boy at school and could not call upon them. Mechanics claimed his whole attention as a youth, his quiet, dreamy and retiring disposition causing him, no doubt, to be avoided by the more exuberant and wayward spirits of his age, but to his personal and intimate friends he exhibited an extraordinary lovable personality. To those who now read his life in retrospect what can be more beautiful as illustrative of his character than the subscription to a letter of advice to his younger brother when the latter was starting school for the first time: "Whatever happens, NEVER TELL A LIE," the capitals being embellished by pretty child-like flourishes.

At the age of fourteen he entered a paper in a children's magazine on "Model Submarine Boats," accompanied with coloured drawings, and from thence onward we find abundant evidence of his strong attachment to applied mathematics.

In 1907 he secured a first in the Mechanical Sciences Examination at Cambridge, and Shane Leslie writes of Busk thus: "He was the most promising engineer of his year and solved the problem of aeroplane stability under a high wind that gave the English command of the air." The story of his last minute compilation of a paper which won the Winholt Prize at Cambridge, besides being entrancing, enlightens one regarding his masterly comprehension of his subject. The introduction, in 1911, of "daylight saving" in a club, of which Busk was president, is of more than usual interest owing to the fact that it was four years later before legislation was brought in to enforce the Daylight Saving Act in this country. There is much of an original character in the deliberations of the "Broad Teeth" Club, and the harmonious manner in which all co-operated is perhaps best illustrated by the treatment of the question as to whether the "weaker" sex should be admitted to the meetings, etc., of the club, or not, and the varied solutions put forward by the members. This was more or less occasioned by some members tying the Gordian knot.

It was in 1911 that Edward Busk started a series of experiments on flying-machine designs, and he expressed his desire of completing a successful machine before going on to commercial work. A year later he was appointed assistant engineer physicist at the Royal Aircraft Factory, and there learned to fly under the tuition of Geoffrey de Havilland. Publicity came to Busk in 1913 as a result of his invention of the "Ripograph" for recording on a photographic strip the pilot's movements in warping and in steering vertically and

right and left, together with speed, inclination and roll of machine. By November of the same year Busk had achieved his first inherently stable aeroplane, which was called the R.E.1 (the forerunner of the B.E.2c), and to his work in this connection many glowing tributes are recorded, and our present Director of Civil Aviation, Major-General Sir Sefton Brancker, at this period made some experimental flights with Busk as pilot. In May, 1914, Busk had the honour of personally showing Their Majesties, the King and Queen, through his department at the Royal Aircraft Factory at Farnborough, and later, by command of the King, he flew R.E.1 with Col. Clive Wigram as passenger, on demonstration flights. When war broke out, Busk happened to be at Plymouth with the Territorial Engineering Corps, but was at once recalled to Farnborough. Of the few months that intervened before his death, this much only is known, that Busk was among the busiest of men at the Royal Aircraft Factory. One need not dilate upon this period, those days being fresh in the minds of all. It was on November 5, fittingly as the sun was setting, the light of Busk's life passed away. When about a thousand feet up, his machine burst into flames, and glided down on Laffan's Plain at Aldershot, the pilot being incinerated. There can be no doubt that when the history of the progress in aviation in this country comes to be written, Edward T. Busk's name will hold an honoured place, even, as Lord Rayleigh writes, "beside those of the Brothers Wilbur and Orville Wright." Lord Rayleigh, President of the Advisory Committee of Aeronautics, pays tribute to the assistance Busk rendered in the investigation of very difficult problems at the National Physical Laboratory, as also did others too numerous to mention here. On November 18, 1914, the Council of the Aeronautical Society decided to award, posthumously, the Gold Medal of the Society (the highest honour which the Society can confer) in recognition of his distinguished services to aeronautical science.

Col. Mervyn O'Gorman, C.B., in summing up an obituary notice, recording Busk's life and work, remarks: "He resembled other men of genius in the simplicity of his methods and the speed at which he worked, and he was remarkable for the soundness of the scientific judgments he arrived at. His youth, for he was only 28 years of age, is an added cause for regretting the termination of a career so brilliantly commenced."

Included in this book is a short memoir of Busk's younger brother, Flight-Commander Hans Acworth Busk, R.N.A.S., who, though only a mere youth of 21, passed through some exciting escapades in the early days of the war. On January 6, 1916, in a Henry Farman biplane, he started off to raid a German aerodrome, carrying a 550-lb. bomb, since when nothing definite regarding his ultimate fate has ever been heard except the fact that it was officially announced in December of the same year that he was presumed to have been killed in the previous January.

Mrs. Busk has done a real service in presenting this volume to those engaged in aviation, and to anyone who may be inclined to the view that she has eulogised the work of her son over much, we can only recommend the chapter written by Major R. H. Mayo (chief assistant to Busk at the Royal Aircraft Factory), and also those passages from notable figures in the industry today.

M. P. S.

E. T. Busk—A Pioneer in Flight. By Mrs. Mary Busk. (With a short memoir of Flight-Commander H. A. Busk, R.N.A.S.) John Murray. 7s. 6d. net.

IN PARLIAMENT

Re-Occupation of Air Stations

SIR F. SYKES, on December 3, asked the Secretary of State for Air what air-station properties previously in ownership or part ownership of the State and disposed of after the War, have been, or according to present proposals are to be reoccupied by the Air Ministry; and if he will ascertain and state the total sum realised from their disposal and the total estimated cost of reacquisition.

SIR S. HOARE: As regard the first part of the question, none of the air-stations properties which have been or, according to present proposals, are to be reoccupied by the Air Ministry, were previously owned in whole or in part by the State and disposed of after the War. The following stations which were occupied during the War under compulsory powers and released are being reoccupied:—Bicester, Boscombe Down, Filton, Castle Bromwich, Hendon, Hucknall, Suttons Farm, Upper Heyford, Waddington, Wittering, Three other stations, North Weald Bassett, Turnhouse, and West Drayton, which had also been occupied, were partly purchased by the Liquidation Department, from whom the Air Ministry has since repurchased the portions retained. As regards the second part of the question, buildings which existed at the stations referred to were sold by the Liquidation Department, in many cases for removal and to a number of separate purchasers, and in other cases were disposed of to the owners of the land in part settlement of their claims for reinstatement and to ascertain the total sum realised would involve the investigation of a large number of records and accounts extending over a considerable period. I cannot see that any public purpose would be served by an investigation involving so much labour and resulting in a figure which is in no way comparable with the cost of reacquisition. The total estimated cost of acquisition of the lands and reacquisition of buildings, where existent, is £243,000. This total includes nothing for the purchase of Hendon, which has formed the subject of complicated negotiations involving war debts; these negotiations are not yet complete.

Accidents

MR CASSELLS asked the Secretary of State for Air the number of deaths in the Royal Air Force due to machines crashing during the year 1924.

SIR S. HOARE: The number of deaths of Royal Air Force personnel in air accidents during 1924 was 70.

Halton College

SIR FREDRIC WISE, on December 7, asked the Secretary of State for Air the number of boys at Halton College, and the number of tutors, doctors, etc.?

SIR S. HOARE: The number of aircraft apprentices at Halton is 1,740, and of the instructional staff (to whom I assume that my hon. friend refers) 253. The medical staff at Halton Hospital consists of nine officers and 94 airmen, but their duties are not confined to providing medical attendance for the school, the hospital being a central one for the whole Air Force.

Cranwell Cadet Training School.

SIR F. WISE asked the number of cadets at Cranwell, and the cost per cadet to the State?

SIR S. HOARE: The answer is 103 cadets and the annual cost, according to an investigation carried out for the year 1923-24, approximately £550, including all overhead charges, but excluding flying training.

SIR F. WISE: Are there any boys at Cranwell besides cadets?

SIR S. HOARE: As far as my memory goes there are about 800 boys there in addition to cadets.

SIR F. WISE: Is the cost of the boys included in that amount?

SIR S. HOARE: Yes, but that is an entirely different calculation. The two institutions, although at the same place, are run quite separately.

MR. MORGAN JONES: Does the cost stated in the answer cover the cost of buildings as well?

SIR S. HOARE: No, Sir. It is the maintenance cost, and obviously it would not cover the cost of the buildings.

Hospital Beds

BRIGADIER-GENERAL CHARTERIS asked the Secretary of State for Air the present number of equipped beds in hospitals under the Air Ministry;

and the average daily number of patients in these hospitals during the current year?

SIR S. HOARE: The answer to the first part of the question is 1,586; to the second, 528. Of the 1,586 equipped beds, 1,139 are in hospitals in Iraq and Palestine which cater for the whole garrisons, i.e., Army as well as Air Force and British as well as Indian troops and, in Palestine, the British Gendarmerie in addition. I may add that it is necessary to provide beds considerably in excess of the average occupation in order to be in a position to cope with epidemics, casualties, seasonal illnesses, and the special conditions under which the forces in the Middle East are serving, but their number is and will continue to be brought under constant review.

Fatal Accidents

BRIGADIER-GENERAL WARNER, on December 9, asked the Secretary of State for Air the percentage of fatal flying accidents that have occurred in the Royal Air Force from January 1, 1924, to September 1, 1924, and from January 1, 1925, to September 1, 1925, in comparison with the number of hours flown in each period?

MAJOR SIR PHILIP SASSOON: The number of aircraft hours flown per fatal accident during the period in 1925 referred to was greater by 92 per cent. than the figure for the corresponding period in 1924. I need hardly remind my hon. and gallant friend that it would be unwise to draw too definite deductions from comparative figures taken over arbitrarily selected periods, but, as he will see, there has been a most striking and satisfactory decrease in the ratio of casualties to hours flown.

BRIGADIER-GENERAL WARNER: Is this most satisfactory diminution in fatal flying accidents due to the initiation of any new system of training, or in the training of young pilots is any new type of special aeroplanes being used?

SIR P. SASSOON: It is the general increase in efficiency all round, and the causes mentioned by my hon. and gallant friend may have played a part.

Aircraft

COLONEL GRETTON asked the Secretary of State for Air if he is now able to give the number of machines in the Air Force efficient and immediately ready to fly on emergency under war conditions both at home and stationed abroad?

SIR P. SASSOON: The first-line strength of the regular squadrons of the Royal Air Force at the present time at home and abroad is approximately 650 machines. This figure, like that which I gave in reply to the previous question on the 2nd instant, excludes the establishment of 58 first-line machines on the strength of auxiliary and special reserve squadrons. This establishment is now in course of being completed, and these 58 machines, though not immediately ready for flying under war conditions, could then be made available on emergency at very short notice. Machines on the strength of training, experimental and research units are also excluded.

Bentley Priory Purchase

SIR F. HALL asked for what purpose the Ministry are arranging to buy Bentley Priory, Stanmore, for the use of the Royal Air Force; how the purpose is now met; and what is the total cost involved in the scheme?

SIR P. SASSOON: As regards the first part of the question, Bentley Priory is being purchased for use as headquarters of the re-organised Inland Area, Royal Air Force, which is to form in April next. As regards the second part, the existing Inland Area headquarters are at Hillingdon House, Uxbridge, and this accommodation, when vacated, will be used for the Fighting Area headquarters of the Home Defence Force, which is part of the approved Home Defence expansion scheme. As regards the last part of the question, the total cost involved in the acquisition and adaptation of Bentley Priory will be approximately £40,000. I may add that the purchase and adaptation of these premises is the most economical method of providing the accommodation required for these headquarters; to purchase a site and erect new buildings thereon would entail a much heavier outlay.

SIR F. WISE: What is the acreage?

SIR P. SASSOON: I think it is 41 acres.

ROYAL AERONAUTICAL SOCIETY



Special General Meeting.—A Special General Meeting of the voting members of the Royal Aeronautical Society has been called for Wednesday, December 30, at 5.30 p.m., to receive the Council's recommendations for the revision of the rules necessitated by the proposed regrading of the membership, alteration of subscription and formation of branches.

Lecture.—The next lecture of the Sixty-first Session will take place on Thursday, January 7, 1926, at 6.30 p.m. in the Library at 7, Albemarle Street, W. 1, when Prof. A. J. Sutton Pippard, D.Sc., F.R.Ae.S., will read a paper on "The Experimental Analysis of Frameworks with Special Reference to the Problems of Airship Design." The chair will be taken by Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C.

Sixtieth Anniversary of the Society's Foundation.—A conversation will be held in the Aeronautical Section of the Science Museum on the evening of Tuesday, January 12, to celebrate the sixtieth anniversary of the Society's foundation.

J. LAURENCE PRITCHARD,
Hon. Secretary

Lecture Programme, 1925-26

(Second Half of Series.)

- January 7.—Prof. A. J. Sutton Pippard, D.Sc., F.R.Ae.S., "The Experimental Stress Analysis of Frameworks with Special Reference to the Problems of Airship Design."
 - January 21.—Maj. J. S. Buchanan, A.F.R.Ae.S., "The Schneider Cup Race, 1925."
 - February 4, 7.0 p.m.—Joint Meeting with the Institution of Automobile Engineers, at the Royal Society of Arts. Mr. C. L. Lawrence, "American Aircraft Engine Development."
 - February 25.—Mr. A. J. Cobham, "Long-Distance Aeroplane Flights."
 - March 4.—Maj. G. H. Scott, A.F.C., A.F.R.Ae.S., "The Development of Airship Mooring and Handling."
 - March 18.—Flight-Lieut. H. Cooch, "Landing Aeroplanes in Fog."
 - April 15.—Capt. G. T. R. Hill, A.F.R.Ae.S., "The Tailless Aeroplane."
 - April 29.—Lieut.-Col. V. C. Richmond, A.F.R.Ae.S., "The Results of Recent Airship Flight Tests."
- Lectures take place at 6.30 p.m. at 7, Albemarle Street, unless indicated otherwise.

THE ROYAL AIR FORCE

London Gazette, December 8, 1925

General Duties Branch.

Lt. J. F. Fosbrooke Pain, 1st King's Dragoon Guards, is granted a temp. commn. on seconding for four years' duty with the R.A.F. (Nov. 28).

The follg. are transferred to the Reserve:—Class A.—Wing Comdr. J. P. C. Sewell, O.B.E. (Dec. 5); Class B.—Flying Officer J. Durward (Dec. 7); Pilot Officer D. T. H. Hooke relinquishes his short service commn. on account of ill-health (Dec. 9); Pilot Officer P. K. Copperthwaite resigns his short service commn. (Nov. 25); The short-service commn. of Pilot Officer on probation H. B. M. Barton is terminated on cessation of duty (Dec. 9).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander D. S. K. Crosbie, O.B.E., to No. 4 Flying Training Sch., Egypt, pending taking over command; 20.11.25.

Squadron Leader D. F. Stevenson, D.S.O., M.C., to No. 6 Sqdn., Iraq; 13.11.25.

Flight Lieutenants: T. C. Luke, M.C., to H.Q., Iraq; 1.11.25. M. F. Browne to Engine Repair Depot, Egypt; 24.11.25.

Flying Officers: B. E. Essex, to No. 1 Stores Depot, Kidbrooke, 24.11.25. R. D. Lambert, to No. 1 Stores Depot, Kidbrooke, 24.11.25. L. Horwood, M.C., F. B. Ludlow, O.B.E., M.C., L. L. Bray, P. Alderson, and H. D. Giblett, to No. 1 Stores Depot, Kidbrooke, on appointment to Permanent Commns. (on probation), 24.11.25. L. R. Peirce, to No. 1 Stores Depot, Kidbrooke, 25.11.25. S. D. Dennis, to H.Q. Coastal Area, 3.11.25. R. A. Dolton, to R.A.F. Depot, on transfer to Home Estab., 25.11.25. C. Lloyd to No. 208 Sqdn., Egypt; 21.11.25.

Pilot Officers: E. H. Broad, to No. 111 Sqdn., Duxford, 17.11.25. E. G. M. Charleson, to No. 2 Sqdn., Manston, 17.11.25. R. H. Clay, to No. 25 Sqdn., Hawkinge, 17.11.25. D. J. Divett, to No. 99 Sqdn., Bircham Newton, 17.11.25. G. H. Doveton, to No. 13 Sqdn., Andover, 17.11.25. F. W. Felgate, to No. 23 Sqdn., Henlow, 17.11.25. E. J. Fishenden, to No. 9 Sqdn., Manston, 17.11.25. P. J. Mote, to Aeroplane and Armament Experimental Estab., Martlesham Heath, 17.11.25. P. P. S. Rickard, to No. 32 Sqdn., Kenley, 17.11.25. L. Taylor, to Mechan. Transport Repair Depot, Shrewsbury, 17.11.25. C. P. Marshall, to H.Q., Cranwell, 16.11.25.

Stores Branch

Flying Officer W. Liniker to Engine Repair Depot, Egypt; 24.11.25.

Accountant Branch

Flight Lieutenant R. M. Grundy, to Central Flying Sch., Upavon, on transfer to Home Estab., 1.12.25.

Flying Officers: A. C. Pritchard, to Sch. of Balloon Training, Larkhill, on transfer to Home Estab.; 23.11.25. A. J. Moore, to Engine Repair Depot, Egypt; 2.11.25. D. F. A. Clarke, to H.Q., Egypt 18.11.25.

Flying Officer E. W. Horncastle, to No. 55 Sqdn., Iraq, 10.11.25.

Pilot Officer R. W. Collinson, to No. 99 Sqdn., Bircham Newton, 15.12.25.

Pilot Officers: The undermentioned pilot officers are all posted on appoint-

Accountant Branch.

The follg. Pilot Officers on probation are confirmed in rank and are promoted to rank of Flying Officer (Nov. 10); C. E. Ashton, H. J. Titherington, C. F. Goatcher, C. Lorimer, E. Smith.

Reserve of Air Force Officers.

A. M. FitzRandolph is granted a commn. in Class A, General Duties Branch, as a Flying Officer on probation (Dec. 8); R. C. H. Joy is granted a commn. in Class AA General Duties Branch, as a Pilot Officer on Probation (Nov. 23). The follg. are confirmed in rank:—Flying Officer.—J. E. A. Hoare, D.S.C. (Oct. 1); Pilot Officers.—J. D. Sinclair (Nov. 5); E. J. Dillnutt (Dec. 2); Flying Officer J. R. Astin is transferred from Class A to Class C (Nov. 28).

ment to Permanent Commns. (on probation) to No. 1 Stores Depot, Kidbrooke, with effect from 7.12.25:—D. C. Stone, C. L. Cook, H. R. Withers, A. E. Fairs, M.C., J. P. Cave, D. Sender, J. A. Stephenson, A. L. Derry, K. A. Jackman, W. F. Quilliam, J. Lambie, H. Crowther, and R. Cassels.

Medical Branch

Squadron Leaders: R. W. Ryan, M.B., to Aircraft Depot, Egypt; 17.10.25. F. E. Johnson, to No. 4 Flying Training Sch., Egypt; 17.10.25.

Squadron Leader A. J. O. Wigmore, M.B., to H.Q., Iraq, 18.11.25.

Flight Lieutenant (Dental): D. H. W. Williamson to R.A.F. Depot on transfer to Home Estab.; 17.10.25.

Flight Lieutenants: E. D. D. Dickson, M.B., F.R.C.S. (E.), D.L.O., to R.A.F. Brit. Hospital, Iraq, 18.11.25. (Hon. Squadron Leader) E. Brown, to R.A.F. Depot, 25.11.25. E. G. Howell, to Engine Repair Depot, Egypt, instead of to Aircraft Depot, as previously notified, 15.10.25.

Flight Lieutenants: G. H. H. Maxwell, M.B., to No. 216 Sqdn., Egypt; 5.11.25. J. Prendergast, M.B., B.A., to No. 24 Sqdn., Kenley; 13.11.25.

Flying Officers: L. C. Palmer-Jones, M.B., to Central Flying Sch., Upavon; 17.11.25. R. L. C. Fisher, M.B., J. Parry-Evans, and F. L. White, to R.A.F. British Hospital, Iraq; 21.10.25. H. C. Patterson and B. Pollard, to Station Commandant, Hinaidi; 21.10.25.

Flying Officers: T. Glynn, M.B., to R.A.F. Depot, on transfer to Home Estab., 30.10.25. G. J. Hanley, M.B., B. W. Cross, J. Mac C. Kilpatrick, M.B. C. G. J. Nicholls, M.B., and R. F. G. Dickson, to H.Q., India, 18.11.25. W. A. Beck, M.B., D.P.H., to H.Q., Palestine, 18.11.25. W. D. McKeown, M.B., to R.A.F. Depot, 1.12.25. E. A. Aslett, and H. M. Levy, to Research Lab. and Med. Officers' Sch. of Instruction, Hampstead, on appointment to Short Service Commns. for short course, 1.12.25.

Flying Officer R. J. K. Chattey, to Aeroplane and Armament Experimental Estab., Martlesham Heath; 19.11.25.

Flying Officer (Dental): H. I. Clapperton to R.A.F. Depot on appointment to a Temp. Commn.; 2.11.25.

Chaplains' Branch

Rev. J. G. Stephens, M.A., to Station Commandant Hinaidi, Iraq; 18.11.25.

Legal Branch

Flight Lieutenant D. L. Iugpu to H.Q., Egypt; 20.11.25.

Cranwell: Inspection of Cadets

On December 15, Air Vice-Marshal Webb-Bowen was present at the passing-out inspection of Flight-Cadets at Cranwell. He was received with the air salute, and after inspection and march past he inspected the workshops and a flying parade. At the prize-giving the sword of honour was awarded Flight-Cadet Under-Officer E. B. Webb; the R. M. Groves Memorial Prize for best all-round pilot for senior term, Flight-Cadet Corporal J. C. Wallace; the Abdy Gerrard Fellowes Memorial Prize for the highest total marks in mathematics and science, Flight-Cadet H. G. Wisber; the prize for English and History (fourth term) Flight-Cadet Corporal C. M. Heard; the aeronautical engineering (fourth term) passing-out prize, Flight-Cadet H. D. Spreckley.

The Commandant, Air Commodore A. E. Borton, stated that the total strength of the Cadet College was 102, of whom 25 were due to pass out this term. The total flying time during the term had been 1,499 hours 45 mins., and the cadets now passing out averaged 70 hours 46 mins., of which 24 hours 16 mins. had been solo on service types of aircraft.

Staff Colleges: Camberley

The following officers have been nominated for admission to the Staff College, Camberley:—Wing Commander O. T. Boyd, O.B.E., M.C., A.F.C., R.A.F.; Sqdn. Ldr. V. S. E. Lindop, R.A.F.

Anti-Aircraft Gunnery Courses

A new provision in the King's Regulations states that, with a view to training officers and non-commissioned officers of the Royal Artillery for certain appointments which involve a special knowledge of anti-aircraft gunnery, a course of instruction of about ten weeks' duration will be held annually at the School of Anti-Aircraft Defence for a limited number of officers and N.C.Os. who have previously passed the gunnery staff course without qualifying in anti-aircraft gunnery.

The exact dates of the course and the number to attend will be published in the Programme of Courses of Instruction issued annually with Army Council Instructions. Officers who obtain a qualifying certificate at the end of the course will have "†" added to the symbol against their names in the Army List.

Inst.Ae.E. "Minutes of Proceedings"

No. 7 of "Minutes of Proceedings" just issued by the Institution of Aeronautical Engineers contains reports of the following meetings: "Photo-elastic Methods of Measuring Stress," a paper read by Prof. E. G. Coker, D.Sc., F.R.S., M.I.C.E., of University College, London. "Flying in Australia," a paper by Mr. H. L. J. Hinkler. Copies of the "Minutes of Proceedings" may be obtained from the offices of the Inst.Ae.E., 34, Broadway, Westminster, London, S.W. 1, price 1s. 6d.

With the Prince of Wales in Africa

We have before us an extremely interesting brochure, issued by Crossley Motors, Ltd., and C. C. Wakefield, Ltd., entitled "With the Prince of Wales in Africa." It contains a brief but concise account of our Prince's wonderful tour in Africa this year, together with several excellent illustrations. From it we learn that His Royal Highness and his staff did much of their journeying by the aid of a fleet of Crossley cars, not only during the South African tour, but also on the occasions of previous tours—Australia, India, Japan, etc. The whole brochure is excellently produced, and is a souvenir of this historic event well worth obtaining—on which the producers are to be congratulated.

Night London-Paris Air Service.

IMPERIAL AIRWAYS LTD., are now making final arrangements for an experimental night goods service between London and Paris. The Vickers "Vanguard" (Rolls-Royce "Condor") will be used for this experiment, which will be made next January.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

AVIATION AND PUBLIC SCHOOLS

[2108]. The last issue of *FLIGHT* announced a scheme for increasing the general interest of aviation in our public schools. May I be allowed space in your valuable journal to express my delight that something of the sort has at last been done. In an issue of *FLIGHT* appearing last March you were good enough to publish a letter from me expressing my hope that something "official" might be done. It is interesting to see that it has been left to private enterprise to set on foot some sound scheme such as that of Maj. Stammers and Maj. Hemming.

That some such form of "education" is very necessary can be seen from the facts that at Harrow:—

(i) During the last four years only one boy has gone to Cranwell direct from the school. Two, however, including myself, sat for the November examination.

(ii) During the same time there has been only one lecture on aviation, that by Sir Samuel Hoare, himself an old Harrovian, about four or five months ago.

(iii) There is only one present member of the school, myself, who is a member of a light 'plane club.

This new scheme, however, will, I feel sure, do a great deal to encourage "that air sense," and I wish it every possible success.

Harrow-on-the-Hill.

H. H. LEECH

AERO GOLFING SOCIETY

THE Annual Dinner and Meeting was held at the Royal Aero Club on Thursday, December 3, 1925, and was presided over by the Captain, Sir Henry White-Smith, C.B.E. The following officers were appointed for the year 1926:

President: Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P.

Captain: E. J. B. How.

Hon. Treasurer: Lieut.-Col. F. K. McClean, A.F.C.

Hon. Secretary: Harold E. Perrin.

Committee: A. J. A. Wallace Barr, P. Barry, Eng.-Com. W. Briggs, R.N., Lieut.-Col. W. A. Bristow, F. Cumbers, C. R. Fairey, Capt. L. V. Pearkes, Sir Henry White-Smith, C.B.E.

Parnall & Co.'s Fourth Annual Dinner

ON December 12, Mr. George G. Parnall presided at the fourth annual dinner of Messrs. George Parnall & Co., held at St. Stephen's Restaurant, when a large company attended. The short but interesting toast list was interspersed with pleasing musical items. The toast of "The Firm" was proposed by Mr. A. E. Daniels, and responded to by Mr. George Parnall. The latter said he thought they had won their way through the ability of their staffs, and he thought they could legitimately claim that they were second to none in the design and manufacture of aircraft. Mr. H. Bolas was chiefly responsible for the success of the aircraft side of their business, and he was recognised by the Air Ministry as a designer of the first rank, and under his guidance, and the support which he received from the staff generally, he (Mr. Parnall) believed that they would soon be receiving production orders. In the past year Mr. Bolas and his staff had given to the Air Ministry two excellent machines, viz., "The Pike" reconnaissance machine, and the "Peto" single seater. They had been requested by the Air Ministry to design other machines, which would give their designer and his staff full employment. Mr. Parnall further stated that they had acquired the Yale Aerodrome, and he hoped that in a few weeks that the whole of the work at the Bristol Coliseum would be transferred to Yale.

Royal Aero Club and Christmas

WILL members please note that on Christmas Day, Boxing Day and Sunday, December 25, 26, and 27, luncheons, dinners and teas will not be served and the bar will be closed. Breakfasts only will be served to members staying in the Club.

And the R.A.F. Club

THE Royal Air Force Club will be closed for the Christmas Holidays from midnight on Christmas Eve until 8.0 a.m. on December 28, except in so far as affects bedroom accommodation (with breakfast only) to residents and members who have engaged bedrooms prior to noon on Christmas Eve. A few bedrooms only will be available for the use of members passing through London on Sunday night, December 27.

IMPORTS AND EXPORTS, 1924-1925

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913. see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; for 1922 see "FLIGHT" for January 18, 1923; for 1923, see "FLIGHT" for January 17, 1924; and for 1924, see "FLIGHT" for January 22, 1925.

	Imports.		Exports.		Re-Exports.	
	1924.	1925.	1924.	1925.	1924.	1925.
Jan. . .	2,213	3,546	52,239	83,728	2,219	291
Feb. . .	920	985	26,349	85,639	335	20
Mar. . .	11,381	—	34,113	56,881	509	9,355
Apr. . .	373	321	56,998	78,041	6,014	6,732
May . .	3,426	560	125,138	74,844	4,162	15,278
June . .	1,219	190	87,629	71,009	2,115	667
July . .	1,510	184	179,292	159,262	2,708	870
Aug. . .	687	469	247,982	113,054	950	—
Sept. .	4,383	1,224	67,749	111,237	641	213
Oct. . .	2,715	460	143,512	114,563	3,743	855
Nov. . .	2,349	837	100,505	84,163	1,007	2,314
	31,176	8,776	1,121,506	1,032,421	24,403	36,595

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1924.

Published December 17, 1925.

19,979. M. LOBELLE. Shock-absorbers. (243,079.)
26,549. SPERRY GYROSCOPE Co. Signalling from dirigible craft. (224,547.)
28,669. SUPERMARINE AVIATION WORKS, LTD., and R. J. MITCHELL. Engine mountings. (243,168.)

PUBLICATIONS RECEIVED

The Accessory. Vol. II. No. 121. November, 1925. Brown Brothers, Ltd., Great Eastern Street, London, E.C.2.

Radio Research Board Special Report No. 3. Variations of Apparent Bearings of Radio Transmitting Stations. Part II. Observations on Fixed Stations, March, 1922-April, 1924. Department of Scientific and Industrial Research. H.M. Stationery Office, Kingsway, London, W.C.2. Price 4s. 6d. net.

The Official Gazette of the United States Patent Office. Vol. 340, No. 1. United States Patent Office, Washington, D.C., U.S.A. November 3, 1925.

The Canadian Patent Office Record. Vol. LIII, No. 45. November 10, 1925. Canadian Patent Office, Ottawa, Canada. Price 25 cents.

Catalogue

Supermarine Flying Boats.—The Supermarine Aviation Works, Ltd., Southampton.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C.2.

Telegraphic address: Truditur, Westcent, London.

Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM			ABROAD*		
	s.	d.		s.	d.
3 Months, Post Free . .	7	7	3 Months, Post Free . .	8	3
6 " " " " " "	15	2	6 " " " " " "	16	6
12 " " " " " "	30	4	12 " " " " " "	33	0

* Foreign subscriptions must be remitted in British currency.

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C.2, and crossed Westminster Bank.

Should any difficulty be experienced in procuring "FLIGHT" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.